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JOURNAL OF POLICY AND PRACTICE

THE ADMINISTRATOR OF NATIONAL BANKS
UNITED STATES TREASURY

Articles on

- Heller's "New Dimensions"
- Cyclical Liquidity Management
- A Theory of Foreign Exchange
- A Study of Bank Costs
- Common Trust Funds in 1966
- Bank Service Charges and Costs
- Determinants of Chain Banking
- Free Reserves and Supply of Deposits
- Indicators of Monetary Policy
- Canadian Banking Legislation

- Notes and Comments
- Selected Statistical Data
- Book Reviews

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The NATIONAL BANKING REVIEW

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ON THE COVER—The Currency Act of 1863, substantially amended by the National Bank Act of 1864, provided for a uniform national currency. Shown is an early national-bank note, and with it a silver dollar issued pursuant to the Bland-Allison Act of 1878.

► ARTHUR F. BURNS

This is a review article of New Dimensions of Political Economy, *by Walter W. Heller. Cambridge: Harvard University Press, 1966. Pp. viii and 203. $3.50.*

Heller's "New Dimensions of Political Economy"

The Godkin Lectures that Professor Walter Heller gave at Harvard University in March 1966 are expanded in his lively book on "New Dimensions of Political Economy." Its central theme is the use of economics in the formation of national policies during the 1960's—a period and subject of which Professor Heller has exceptional firsthand knowledge. The first chapter deals with the role of economists, particularly the Council of Economic Advisers, in shaping economic policies and in advancing the President's program. The second chapter discusses the tools and achievements of the "new economics" since 1961 and "the promise of modern economic policy" for the future. The third and final chapter is devoted to a close examination of the opportunities that growing Federal revenues provide for strengthening the fiscal foundations of hard-pressed state and local governments. Clearly, Professor Heller deals with issues of large significance for the modern world.

His book has other notable qualities. It is humane in spirit and is concerned with the business of life, not merely economic improvement. It presents a lucid and stirring account of the "new economics" in action. It argues eloquently for a strongly activist economic policy, particularly in fiscal matters. It is informed by a thorough understanding of the political process. It seeks to avoid ideological conflict or commitment. And it yields interesting glimpses of the two presidents whom Professor Heller served

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so ably as Chairman of the Council of Economic Advisers. For all these reasons the book deserves to be read widely.

Not all of the book, however, deserves to be remembered, and the main reason is the author's neglect of history. Governmental concern with economic growth is hardly an offspring of the "new economics." In the nineteenth century, economic growth was a paramount objective of our nation's policy—as the debates and legislation on tariffs, internal improvements, banking and currency, land settlement, conservation, and the state of competition testify. With industrialization and urbanization proceeding rapidly, the business cycle naturally became a subject of large public concern toward the end of the century. Much attention was therefore directed in succeeding decades, first to the prevention of financial crises, later to the moderation of fluctuations in the general price level, still later to the prevention of mass unemployment. After World War II, as the nation's resolve to deal with unemployment became stronger and as evidence that the business cycle was moderating accumulated, interest shifted again to economic growth and economic policy became increasingly focused on the simultaneous achievement, as far as feasible, of full employment, a high rate of growth in productivity, and general price stability. The Economic Report of the President in January 1954 stated the modern view accurately: "The new concept that is emerging in the practical art of government . . . is to subject every act of proposed legislation or administrative decision, as far as that is humanly possible, to review from the standpoint of the contribution it is likely to make, whether in the immediate or a more distant future, to the attainment of an expanding economy with maximum employment and without price inflation" (Ec. Rep., p. 112).

Professor Heller brushes aside what happened before the 1960's. He conveys the impression that, at least during the 1950's, the "old mythology and wrongheaded economics" of the budget dominated economic policy (p. 36). He at no time mentions the huge tax cut, or the provisions for accelerated depreciation, or the highway legislation, or the reform of the social security program, or the concern with education and training programs during the Eisenhower years. He notes, to be sure, the restrictive financial policy of 1958-1960, but does not refer to the urgent circumstances from which it arose. "At the 1966 Symposium on the Employment Act," he tells us, "there was much talk of the gradual evolution of economic policy. . . But evolution became revolution the moment we had Presidents—and now we have had two—with the Keynesian perception to welcome their responsibilities under the act and to use its mandate and the weapons of political economy to generate . . . prosperity" (p. 12). This vision of a revolution is indeed suggested by the very first sentence of the book: "Economics has come of age in the 1960's." Again, Professor Heller speaks of Presidents Kennedy and Johnson as "the first modern economists in the American Presidency" (p. 36)—a claim that appears to be largely based on their advocacy of a massive tax cut at a time when the economy was advancing and the budget was out of balance. This was undoubtedly a new, significant, and at the time a salutary departure in economic policy. But if the first modern economist in the presidency is to be identified at all, may not this title belong to President Truman who fought so valiantly for the passage of the Employment Act or perhaps to President Hoover who, despite his tragic inadequacy in a time of crisis, was the first incumbent of the White House to deem it essential to use governmental power to moderate the ill winds of the business cycle?

Between 1961 and 1966, production and employment in our country rose sub-

stantially, the advance of prosperity became widely diffused, full employment was re-established, and new doors of economic opportunity were opened to underprivileged citizens. Professor Heller stresses these achievements and he is right in claiming that the Federal government played a vital part in bringing about these gains. However, he glosses over the disappointments of the '60's—the fact that extensive unemployment lasted much too long; the fact that disequilibrium in the balance of payments escaped correction; the fact that governmental finances continued to show a deficit even when full employment was re-established; and the fact that governmental policy released forces which eventually resulted in a new round of inflation.

Professor Heller properly assigns a high role to fiscal policy, particularly the tax cut of 1964, in the prosperity of recent years. But his view that the expansion was "fiscally spurred" (p. 68) is an oversimplification which fails, in particular, to recognize the strongly expansionist thrust of monetary policy from 1961 to 1965. He claims that the "chief reliance" (p. 95) of fiscal policy during 1961-1965 was tax reduction, when in fact expenditure increases came to a much larger total than tax reduction. He conveys the impression that President Kennedy's proposal to cut income tax rates worked out precisely as planned, but fails to mention that the tax proposal was accompanied by a plan to raise Federal expenditures by nearly $5 billion and that the Congress accepted the former but rejected the latter. And he is surely mistaken in suggesting that Vietnam is responsible for the recent inflation. Many months before Vietnam was of any financial consequence, evidence of economic strain began to appear—particularly, although by no means exclusively, in the markets for raw materials and skilled labor. Signs of incipient pressure on the nation's available resources, which were already plain during 1964, were ignored or overlooked by the policymakers. In fact, during 1965, with Vietnam beginning to hurt and the economy approaching full employment, the Federal government unleashed practically every weapon of economic stimulation—greater monetary ease, lower income tax rates for individuals, lower income tax rates for corporations, lower excise taxes, and larger spending on programs of the Great Society.

The theory of the "new economics" has a fascination for the modern generation because of its intellectual elegance and scorn of evil—the evil of inflation no less than the evil of unemployment. In Professor Heller's words, the "success of the 'new economics' . . . requires willingness to shift or reverse gears" (p. 99). More precisely, "flexibility of program calls for a readiness to move taxes and interest rates up as inflation pressures mount and down as demand ebbs" (p. 100). But this fine rule of symmetry was practiced unevenly by policymakers during the '60's—as it had indeed been before them, thereby strengthening the fears of many that the "new economics" may in practice be just another engine of inflation. Even now, Professor Heller does not stop to ponder or even to note the fact that the wholesale price level rose 4 percent between mid-1964 and the end of 1965. Even now, he believes that economic conditions required "overt fiscal stimulus" (p. 95) during 1965. Even now, while he takes pride in the boldly expansionist policy that was pursued when unemployment was extensive, he explains the hesitations of fiscal policy during 1966 on the simple ground that "the economic calculus was clouded by uncertainty" (p. 88).

Professor Heller professes little interest in the business cycle. "Gone is the countercyclical syndrome of the 1950's," he announces in the Preface. Later, he explains that closing of the gap between actual and potential output "rather than the smoothing of the business cycle be-

came the main preoccupation of policy" (p. 64); and that "the main instrument for dethroning the cyclical model and enthroning the growth model has been the GNP or performance gap" (p. 62). Apart from language, I am unaware of any real difference between "gap-closing" and "smoothing of the business cycle" provided, of course, that the smoothing is substantial and occurs at a high level of the employment rate. There is no real difference here between the objectives of economic policy during the '60's and the objectives during the '50's. However, "enthroning the growth model" cannot of itself rid the economy of the processes stressed by business-cycle theory—for example, the imbalance that normally develops between capital investment and consumption or between costs and prices as the economy moves toward full employment. The "cyclical model" therefore serves a diagnostic purpose and its neglect can prove serious, as it indeed has. Fortunately, "the countercyclical syndrome of the 1950's" is not yet entirely "gone." It has not even been entirely abandoned by Professor Heller, for he too recognizes the need "to avoid the excesses that destroy expansions" (p. 49).

The unique function of the Council of Economic Advisers, in Professor Heller's well chosen words, is "to put at the President's disposal the best facts, appraisals, and forecasts that economic science, statistics, and surveys can produce" (p. 16). But, as he explains, the activities of the Council extend beyond giving advice to the President himself. Professor Heller discusses perceptively the activities of the Council since 1961, but he again fails to do justice to earlier history. He conveys the impression that prior to 1961 the Council pursued a "detached, Olympian, take-it-or-leave-it approach to Presidential economic advice" (p. 15). This description may fit the brief period when Dr. Nourse was Chairman of the Council. Otherwise, it is simply untrue. During 1953-1956, for example, the Chairman of the Council had weekly scheduled meetings with the President—a privilege that only one other member of the government, the Secretary of Defense, enjoyed. He had full access to the President at other times and he used it when necessary. He represented the Council at weekly Cabinet meetings, made frequent reports on current and emerging policy requirements, and participated actively in Cabinet debates on economic matters. He served as Chairman of various Cabinet committees and used the opportunity to advance the Council's program. He worked closely with the Secretary of the Treasury and the Chairman of the Federal Reserve Board. He and his Council colleagues spent a good part of practically every day striving for a consensus on policy issues with representatives of the various departments and agencies. The Council thus fought tirelessly within the Executive establishment for the policies that it deemed needed and proper. The Council did not, however, take to the stump and fight in the public arena for the President's program. It refrained from this essential political activity because it felt, by and large, that professional economists should stick to their knitting, that economic counseling and political advocacy could get in one another's way, and that economists should not devote their precious time to do what politicians—who at least then were not in short supply—can do better.

In other periods, both before and after President Eisenhower's first administration, the Council did indeed choose to play a large and active public role. Since 1961, as Professor Heller explains in detail, the Council has considered its advisory responsibility to include public advocacy of the President's program and even the occasional release of trial balloons in his behalf. It may not be easy to decide, on the basis of evidence yet available, whether such activities seriously interfere with the objectivity and receptiveness to new thought and fresh evi-

dence that the Council needs to have. It is still useful, however, to remember that political activities on the part of the Council nearly led to its destruction not too many years ago.

Whatever view one may take of Professor Heller's treatment of the past, his views concerning the future are always important. His plea for revenue sharing with the states and localities is well reasoned and well documented. It has already aroused wide interest in the Congress and will inevitably become a subject of lively debate once the pressure of Vietnam on the Federal budget eases. Professor Heller also makes an impressive plea for flexibility and speed in fiscal action. Since changes in tax rates affect swiftly the income structure, he feels that "high-speed income tax legislation, quickly translated into changes in withholding and quarterly payment rates, would give the Federal Reserve Board a run for its money in timely stabilization policy" (p. 102). This is difficult to achieve under our form of government, and the subject deserves the most careful thought and study—as Professor Heller urges.

Candor compels me to add that my enthusiasm for high-speed tax legislation, which was once considerable, has waned in recent years. I am not at all confident, by way of example, that fiscal policy in early 1966 would have been less hesitant if "pushbutton procedures or Presidential authority for temporary tax increases" (p. 98) had been available. With such devices at hand, we might very well have had a "quickie tax cut" in the summer of 1962, such as the Council then recommended (p. 33). But in that event, would we have gotten the judicious and well-balanced Revenue Act of 1964 which became law only after Congress had worked long and conscientiously on the economic, ethical, and administrative issues surrounding the income tax? Besides doubts of this character, I do not think that economic forecasting is as yet sufficiently accurate to justify fine fiscal tuning. I also fear that if it ever becomes governmental policy to move income taxes up or down at brief intervals, this rule of fiscal behavior will become a normal part of expectations and the effectiveness of fiscal policy in inducing needed changes in investment and consumer spending will therefore be drastically reduced. Thus, if a tax reduction is deemed to be temporary, it will affect economic activity only through its effect on current disposable income and the spending response may be quite small. On the other hand, if the tax reduction is expected to be permanent, both individuals and corporations will not only be more willing to commit their larger disposable income, but they are also apt to use their brains, their energy, their liquid resources, and even their credit to take advantage of the new environment in which business is to be done. These considerations argue against frequent changes, but not necessarily against speedy changes, of tax rates. It would be helpful to learn what we can from the experience of Great Britain, Canada, and perhaps other countries where quick tax legislation has been practiced.

Let me say, in closing, that Professor Heller's optimism and his compassionate concern with both the present and future are perhaps the most engaging features of his book. His faith in the power and promise of the "new economics" is strong. The following is a typical utterance: "I count on our growing economic maturity to keep on lowering the political barriers to sound economic decisions" (p. 97). But Professor Heller is realistic enough to recognize that the path of the "new economics" is strewn with rocks in practice. His warning that "if fiscal and monetary policies are consistently less vigorous in checking overexpansion than in combatting underexpansion, the resulting inflationary bias could in part discredit the 'new economics'" (p. 50), is timely and constructive.

► G. WALTER WOODWORTH

Theories of Cyclical Liquidity Management of Commercial Banks

Prior to the second World War, commercial banks often maintained excessive positions of cyclical liquidity. Since that time, however, the opposite error has been more common. Many commercial banks, finding themselves with large excess reserves during recessions, have reached for more current income by purchasing too many intermediate- and long-term bonds and too few liquidity (secondary) reserve assets. The penalty was paid during the last phase of all four succeeding cyclical-expansion periods when, in order to meet customer loan demands, investments were sold at substantial capital losses. These losses greatly exceeded the additional income from the longer-term as compared with shorter-term issues; consequently, net profits actually declined in most boom years even though net current earnings (before adjustments for capital gains and losses) recorded substantial increases.

It is the purpose of this paper to trace and analyze the various cyclical liquidity theories. Four different theories can be identified: (1) the commercial loan theory; (2) the shiftability theory; (3) the anticipated income theory; and (4) the liabilities management theory.

1. The Commercial Loan Theory

The commercial loan theory had its origins in England during the 18th century,[1] and it prevailed in the United

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[1] See Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, Everyman's Library Edition, I, pp. 269, 272.

States until after the first World War. In fact, its philosophy permeated both the National Bank Act of 1864, as amended, and the Federal Reserve Act of 1913. In 1923, the Federal Reserve Board expounded a variant of this theory, called a "system of productive credit," [2] which was widely accepted throughout the 1930's.

According to the commercial loan theory, earning assets of banks should consist principally of short-term, self-liquidating loans to business firms for working capital purposes; that is, loans to finance the movement of goods through the successive stages of production, transportation, storage, distribution, and into consumption. Loans for long-term purposes—to finance plant, equipment, permanent working capital, real estate, consumer durables, and speculation—were not regarded as appropriate for commercial banks. The logical basis for the doctrine was that bank deposits are demand or near-demand liabilities, and should therefore be committed to obligations that are self-liquidating within a short period in the normal course of business operations.

Actually, the commercial loan theory was followed quite loosely in practice. This had to be the case since the theory did not fit the economic and financial environment of the United States. During the 19th century the economy was dominated by agriculture, and capital markets were in the early stages of development. Under these circumstances, intermediate- and long-term loans were essential to finance the purchase of land, houses and improvements, livestock, machinery and equipment, and other durables. In addition, loans were needed to finance the fixed-capital requirements of industry, trade, transportation, and public works. A large part of this credit was provided by the commercial banks, the only existing institutions in a position to do so. Frequently, the long-term nature of the credit was concealed by short-term loan contracts which were often renewed at maturity.

The theory was also deficient in other respects. A rigid restraint on the amount of bank assets would entail a similar stricture on deposits (and notes), and the banking system would be unable to provide a stock of money consistent with sustained full employment, healthy economic growth, and a stable level of prices. There was a failure to recognize the relative stability of the fund of deposits in the banking system and in the individual bank which justifies the holding in bank portfolios of long-term assets of high quality—despite the legal right of depositors to withdraw on short notice.

The liquidity of the individual bank was confused with the liquidity of the banking system. The fact that the liquidity of the banking system, irrespective of the maturity of bank loans, ultimately rests with the central bank was not recognized. Last, the commercial loan theory contemplated bank liquidity needs only in relation to the possibility of deposit withdrawals. No mention was made of liquidity requirements to meet the possibility of loan expansion. This aspect of the problem was not recognized until the 1950's.

II. The Shiftability Theory

Soon after establishment of the Federal Reserve System, some economists challenged the traditional commercial loan theory. They called attention to the wide divergence of actual commercial bank assets from those that qualified as automatically self-liquidating in a short period of time. In 1917, B. M. Anderson analyzed bank assets and concluded, "that the great bulk of banking credit in the United States, even of commercial banks, is not commercial credit. . . . Most of it,

[2] See Federal Reserve Board, *Tenth Annual Report*, 1923, pp. 33-34.

. . . represents advances to the permanent financing of corporate industry."[3] In another bank asset study in 1918, H. G. Moulton found that: "The statistics of all commercial banks show that something like 50 percent of all *loans* is devoted to investment uses; and that in the neighborhood of two-thirds of all the credit extended by commercial banks goes for fixed rather than working capital."[4]

The shiftability theory of bank liquidity, which Moulton originated, may be summarized as follows:

1. The greater part of business loans of banks supports permanent working capital and fixed capital needs. Such loans are not usually paid at maturity but are renewed to accommodate the customer. Only seasonal-type loans are paid at maturity, and the cash flow from them is not steady nor dependable, particularly in cyclical financial crises. ". . . the commercial paper of a bank's own customers is among the least reliable of all bank assets as a means of replenishing depleted reserves."[5]
2. Other loans of banks—largely secured by bonds, stocks, equipment, and real estate—represent principally fixed-capital financing, and do not provide an automatic cash inflow from maturities. However, loans secured by marketable stocks and bonds "are more reliable as a secondary reserve than commercial paper loans to customers."[6]
3. Recognizing the lack of liquidity of loans, banks in practice have long safeguarded their liquidity by other methods, principally by holding secondary reserves in the forms of open-market commercial paper and marketable notes and bonds which could be sold to replenish depleted reserves. ". . . the way to attain the minimum in the matter of reserves is not by relying on maturities but by maintaining a considerable quantity of assets that can be shifted to other banks before maturity as necessity may require. *Liquidity is tantamount to shiftability.*"[7]
4. "Among the most shiftable, and hence among the most liquid, of assets are bonds and stocks, both as direct investments and as collateral. The development of the corporate form of enterprise has largely undermined the theory of commercial banking as elaborated to fit the conditions of early nineteenth-century England. The share and bond as claims to fixed capital have a ready transferability; indeed the active securities that are listed on the exchanges have in normal times an almost instantaneous convertibility into cash. The result is that securities are from the standpoint of any individual bank incomparably more liquid in ordinary times than commercial paper of customers—assuming that no special machinery, such as reserve banks, has been developed to permit the same shifting of commercial paper."[8]
5. Moulton also distinguished between the problem of liquidity in ordinary times and in times of cyclical strain or crisis: ". . . in time of crisis almost none of the assets of our banks are liquid in the sense that maturing obligations can be used to replenish reserves, and that so far as there is

[3] B. M. Anderson, Jr., *The Value of Money*, 1926 Ed., New York: The Macmillian Co., 1926, pp. 511-512.

[4] H. G. Moulton, "Commercial Banking and Capital Formation," *The Journal of Political Economy*, July 1918, p. 729.

[5] *Ibid.*, p. 709.

[6] *Ibid.*, p. 713.

[7] *Ibid.*, p. 723; italics supplied.

[8] *Ibid.*, p. 730.

any liquidity at all it is the result of inter-bank accommodations. . . . A time of crisis reveals that the banks are tied up in a system; that the banks as a whole must carry business as a whole; and that when the strain on all banks is heavy, the additional reserve funds required can be secured only by attracting them from other countries or by the manufacture of new forms of reserve money." [9]

6. Finally, Moulton recognized the sharp difference between the individual bank and the banking system with respect to liquidity. He saw that under ordinary conditions the individual bank could repair deficient reserves by shifting (selling) marketable assets to other banks; he also understood that when bank expansion has fully utilized existing cash reserves, no earning assets—whether short-term or long-term—could be converted to cash to support further expansion. At this point, both the individual bank and the banking system could obtain additional liquidity only from the Federal Reserve banks or the Treasury.

The shiftability theory gained an increasing number of adherents with the passage of time, but a traditional theory, even though outmoded, dies slowly and vestiges of the old commercial loan theory persisted through the 1930's.

III. The Anticipated Income Theory

A new theory of commercial bank liquidity, designated "the anticipated income theory," was developed in 1949 by Herbert V. Prochnow. It grew out of a comprehensive study of bank term loans in which he found that:

> "In every instance, regardless of the nature and character of the borrower's business, the banker planned liquidation of the term loan from the anticipated earnings of the borrower. . . . It (liquidation) is not by the sale of assets of the borrower as in the commercial credit or traditional theory of liquidity, nor by shifting the term loan to some other lender as in the shiftability theory of liquidity, but by the anticipated income of the borrower." [10]

Although Prochnow's study was primarily concerned with term loans, he noted that the anticipated income theory applied also to consumer loans.[11] He also recognized that: "In the event of widespread and large withdrawals in the entire banking system, ultimate liquidity is to be found in the central bank or Federal Reserve System." [12]

The early 1930's marked a new era in the terms of bank loan contracts, with highly significant consequences for the liquidity of bank loan portfolios. Loan officers began systematically to adapt loan repayment schedules to the anticipated income or cash receipts of the borrower. Under the new loan contracts with systematic repayment schedules, a continuous cash inflow could be expected from all types of amortized loans. In a growing economy, banks tend to experience cash outflows from their lending operations—from long-term growth in normal years, and from cyclical loan expansion in prosperous years. But in periods of cyclical decline, loan repayments may exceed the amount of new loans with a resultant net cash inflow. Within limits, loan officers can control the net cash flow by policies with respect to (1) granting new loans, and (2) collection of outstanding loans. However, the net cash inflow under the anticipated income theory is not available to meet an increase in total loans during expansion periods, but only in economic contractions to meet possible

[9] *Ibid.*, pp. 723, 730-731.

[10] Herbert V. Prochnow, *Term Loans and Theories of Bank Liquidity*, New York: Prentice-Hall, Inc., 1949, pp. 401-402.

[11] *Ibid.*, p. 408.

[12] *Ibid.*, p. 411.

shifts of deposits to other banks and withdrawals of currency.

It remains to mention that the anticipated income theory can be used to explain a degree of liquidity for the entire commercial banking system which is not implied in either the commercial loan theory or the shiftability theory. Since liquidity in this theory is expressly derived from the flow of income, total loans (and total deposits) may be reduced by savings from borrowers' incomes. This does not in itself increase total cash reserves of banks, but it releases required and working reserves needed to support deposits. In contrast, the commercial loan theory contemplates repayment of loans by the sale of the goods, rather than from income, and it implies the shifting of a repaid loan to another bank and another borrower. The shiftability theory also usually implies the sale of securities or the shifting of loans to other banks, perhaps including the Reserve banks, so that no reduction in total bank credit takes place. However, the exception should be noted that if the banks sell securities to individuals, business corporations, and other nonbank interests, a reduction of total bank loans and investments (and therefore of deposits) takes place. In this event, required reserves are released and the entire banking system becomes more liquid.

IV. The Liabilities Management Theory

During the 1960's, a new theory of cyclical bank liquidity emerged, which may be labelled the "liabilities management theory." According to this new doctrine, it is unnecessary to observe traditional standards in regard to self-liquidating loans and liquidity reserves, since reserve money can be borrowed or "bought" in the money market whenever a bank experiences a reserve deficiency. There are seven possible sources from which the individual bank may acquire reserves by the creation of additional liabilities: (1) acquisition of demand deposits; (2) issuance of time certificates of deposit; (3) purchase (borrowing) of Federal funds; (4) borrowing at the Federal Reserve; (5) issuance of short-term notes; (6) raising capital funds from the sale of capital notes, preferred stock, or common stock, or from retained earnings; and (7) the Eurodollar market.

A. Demand Deposits

The acquisition of demand deposits as a means of meeting cyclical liquidity needs might have been feasible before 1933, when banks were free to pay whatever rates they wished in bidding for such deposits. But the Banking Act of 1933 prohibited these interest payments. Moreover, there has been a definite tendency for total demand deposits to decline during the last half of cyclical expansion periods, largely in response to the tight rein of Federal Reserve policy. Banks must draw these deposits competitively from a smaller total reservoir by aggressive promotion and effective enforcement of balance requirements. Management cannot count on opening this valve whenever cyclical funds are needed.

B. Time Certificates of Deposit

The predominant liability source of reserve money for the individual bank since the early 1960's has been the issuance of time certificates of deposit, mainly in negotiable form. The negotiable certificate market was launched in early 1961 by the large money-market banks of New York City, mainly as a means of attracting deposits of large corporations. Prior to this time, New York City banks paid no interest on corporate time deposits as a matter of policy. But during the first quarter of 1961, they began to offer negotiable certificates with original maturities ranging between 90 days and one year at rates competitive with Treasury bills, commercial paper, bankers' acceptances, Federal agency securities, and

other money market instruments. At the same time, the large bond dealers began to develop a secondary market in CD's which materially enhanced their liquidity features. Growth in the amount of CD's was meteoric, rising steadily from zero in early 1961 to $18.6 billion in August 1966—$7.4 billion in New York City and and $11.2 billion in other cities.[13] With some time lag, the practice spread—first to the large banks outside New York, and later to intermediate-size banks throughout the country, although certificates of the latter were not ordinarily negotiable and did not reach the secondary market. A better idea of overall growth is converyed by the fact that "other time deposits of individuals and businesses" (largely certificates) of all member banks increased from $7.1 billion in April 1961 to nearly $28.7 billion at the end of 1965.[14] Thus, a vigorous new segment of the money market, second only to short-term Treasury securities, grew to maturity in an incredibly short time.

The financial environment of those years provided fertile soil for growth of this new market. The period was one of rapid expansion in the economy accompanied by robust credit demands from businesses, consumers, and governments. These demands furnished the banks with unusual lending opportunities which supplied the incentive to compete strongly for deposits. At the same time, Federal Reserve policies were friendly toward the market's development. An easy monetary policy with relatively abundant bank reserves prevailed until the first quarter of 1965, after which the reins were gradually tightened, but not to the point of reducing the rate of expansion of member bank legal reserves until the second quarter of 1966. Also, the Federal Reserve Board raised the maximum rates which banks could pay on time deposits, so that the banks were not handicapped in bidding up rates to compete for funds.

TABLE 1

Changes in Bank Deposits and Reserves, 1961 and 1966 (In billions of dollars)

Items	February 1961	September 1966	Amount of Increase
Demand deposits *	112.1	132.6	20.5
Time deposits †	60.6	157.1	96.5
Total member bank reserves	18.9	23.5	4.6
Total loans and investments ‡	199.3	313.8	114.5

* "Demand deposits adjusted" as a component of the money supply (seasonally adjusted).
† At all commercial banks.
‡ All commercial banks.

Source: **Federal Reserve Bulletin,** June 1961, pp. 673 and 675; October 1966, pp. 1478 and 1480.

In the banking system as a whole, the issuance of CD's involved a shift from demand to time deposits with a resultant release of required reserves. Table 1 indicates that in the period, 1961-1966, over four-fifths of the demand deposits created by the expansion of bank loans and investments were shifted to time deposits.

The relative ease with which the large city banks could buy reserve money by the issuance of CD's masked some of the limitations of this source under tight credit conditions. Such conditions almost invariably develop sometime during the last stage of a cyclical expansion, and in the current expansion they began to appear in the last half of 1965. Demands for bank credit continued their upsurge, and on the supply side the Federal Reserve tightened the credit reins another notch. Net free reserves of member banks,[15] which had shown a substantial surplus since the last quarter of 1960, moved to a deficit position in the first quarter of 1965 and averaged about $150 million during the remainder of the year.

[13] *Federal Reserve Bulletin,* September 1966, p. 1369.

[14] Board of Governors of the Federal Reserve System, *Summary Reports of Assets and Liabilities of Member Banks,* April 12, 1961, p. 3; December 31, 1965, p. 3.

[15] Excess legal reserves less borrowing at Federal Reserve banks.

Further restraint was applied in 1966, and by July net borrowed reserves exceeded $400 million. Meanwhile in December 1965, the Federal Reserve discount rate was raised from 4 to 4½ percent. In this setting, open-market rates moved up sharply. The 3-month Treasury bill rate rose from 3.99 percent in August 1965 to 5.66 percent in September 1966, and the 4- to 6-month prime commercial paper rate increased in the same period from 4.58 percent to 6.26 percent.[16] In order to compete for money, the leading banks were forced to make corresponding increases in the rates offered on CD's—from 4.50 percent in August 1965 to 5.50 percent by midyear 1966 on certificates of 30 days and more.

This situation points up the first limitation on CD's as a dependable source of reserve money during boom conditions, namely, Federal Reserve control of maximum rates payable. If the structure of rates on competing money market instruments—principally Treasury bills, Federal agency securities, commercial paper, and repurchase agreements for Federal funds—rises above the ceilings on CD's set by the Federal Reserve, the banks can no longer sell them. And if this situation should persist, the amount of outstanding CD's would shrink as maturities occur. Since maturities of outstandings range from one day to one year or a little more, the drain on reserves of the individual bank would begin immediately and would continue until all interest-sensitive CD's were liquidated.

For the banking system as a whole, there would be a substantial increase in legal reserve requirements arising from the shift from time deposits back to demand deposits, although in fact it is likely that the Federal Reserve would soften the blow. It did so in December 1965, after some discomfort, when maximum rates payable were raised from 4½ percent to 5½ percent. But market rates soon closed the gap and rose above the ceiling, with the result that the amount of outstanding CD's declined almost $3 billion between August and November 1966.

Another limitation on CD's as a dependable source of reserves is the fact that the banks must compete strongly among themselves for existing reserve money in boom periods when it is scarce. The large money-market banks hold an advantage in this competition over the smaller banks, because of the wider acceptability of prime, large-denomination certificates, and of the lower rates at which they may be sold. This means that the penalty of excessive dependence on CD's is definitely heavier on intermediate- and small-size banks, since they reach the rate ceiling first. But the money-market banks also compete among themselves for reserves to a large extent, and so are not immune to difficulty.

A final limitation on CD's as a dependable source of reserves is the fact that the Federal Reserve authorities are almost certain to implement a monetary policy of restraint, thereby changing adversely the whole environment of the money market with respect to availability of reserves. In contrast with conditions of business recession when the Federal Reserve is typically on the side of the banks in providing abundant reserves at low rates, it shifts to the opposing side sometime during the last stage of cyclical expansion. Witness 1952-1953, 1956-1957, 1959, and 1966—all periods of rising net borrowed reserves, and of sharply increasing money rates. In large part, these conditions were created, or at least validated, by Federal Reserve policies and actions—whether by sales of U.S. securities, by raising legal reserve requirements, by rationing advances and increasing the discount rate, or by some combination of these methods. Although this limiting factor affects all means of replenishing reserves, it applies uniquely to

[16] Rates adjusted to comparable basis—actual yield on 360-day year.

TABLE 2

Time and Savings Deposits of Large Commercial Banks, 1965-1966
(In millions of dollars)

	July 7, 1965 (1)	December 29, 1965 ‡ (2)	Change between (1) and (2) (3)	June 29, 1966 (4)	Change between (2) and (4)
Savings deposits	48,313	48,084	— 229	48,413	+ 329
CD's *	15,587	17,063	+1,476	18,268	+1,205
Other time deposits †	5,234	5,471	+ 237	10,419	+4,948

* Negotiable CD's issued in denominations over $100,000.
† Time deposits of individuals, partnerships and corporations.
‡ Estimated by raising old "Leading Cities" series by 6 percent.

Source: **Federal Reserve Bulletin,** January 1966, p. 70; July 1966, p. 1008.

CD's because of Regulation Q. In contrast, a bank can always sell short-term U.S. securities to repair its reserve position; and if they are sold to non-commercial-bank investors, deposits decline correspondingly in the banking system and total required reserves are reduced.

In addition to the issuance of negotiable CD's to large corporations, a significant new development took place at the retail level in non-negotiable CD's and other time deposits, beginning in December 1965. On December 6, 1965, the Federal Reserve Board raised the maximum rates payable on time deposits with maturities of 30 days and over from 4½ to 5½ percent. This opened a new door through which commercial banks could compete for savings. Previously this door had been nearly closed by the rate ceilings, which were below rates paid by savings and loan associations and mutual savings banks, and below yields obtainable on open-market securities.

As indicated in Table 2, the banks aggressively entered this field with a variety of time deposit plans. Rates offered were soon bid up to the 5½ percent maximum, which exceeded those paid by competing institutions and the 4 percent ceiling on passbook savings. "Other time deposits" increased $4,948 million during the first half of 1966, compared with only a $237 million increase in the last half of 1965. This gain represented largely the diversion of a greater proportion of savings to the banks. The savings and loan associations, which had enjoyed phenomenal growth since the second World War, suffered heavily. During the first seven months of 1966, their savings capital increased only $577 million compared with $3,758 million in the same period of 1965. Mutual savings banks were also hit hard, the respective gains in deposits during the same periods being $1,080 million and $1,995 million.[17]

The plight of these institutions and the associated threat to residential construction was so acute that the situation became one of considerable national concern. After extensive hearings, the House Banking Committee in late July 1966 approved a bill that would impose a 4½ percent maximum until August 1, 1967 on all commercial bank time deposits of $100,000 and less, thus removing the existing discretionary authority of the Federal Reserve Board over maximum rates in this area.[18] However, the bill which became law on September 21, 1966 (Public Law 89-597) did not in the end set maximum rate ceilings, but granted more flexible authority to the Federal Reserve Board over maximum rates payable by member banks. Similar authority was

[17] *Federal Reserve Bulletin,* October 1966, pp. 1493-1494.

[18] *Wall Street Journal,* July 26, 1966, p. 3.

given the Federal Deposit Insurance Corporation over nonmember banks, and the Federal Home Loan Bank Board over savings and loan associations.[19]

C. Federal Funds

The third source from which the individual bank may acquire reserve money by the creation of additional liabilities is the purchase (borrowing) of Federal funds. This is the market in which banks with deficient legal reserves borrow from other banks having excess reserves. Lenders and borrowers are brought together by two or three broker-dealers in New York City who receive reports by wire from banks all over the country in regard to bids and offers of funds, and by a few large money-market banks that act in part as dealers and in part as brokers and clearing centers of information. There are two principal methods of dealing in this market: (1) straight one-day loans; and (2) repurchase agreements. The great bulk of Federal funds is loaned on a one-day, unsecured basis, although a significant part is secured by U.S. securities. Banks also utilize repurchase agreements under which the borrowing bank actually sells U.S. securities under contract to buy them back in one or more days at a predetermined rate and price. Rates are very sensitive in response to changing currents of supply and demand. They are closely related competitively to other rates in the money market, and particularly to those on Treasury bills. Also, in ordinary times the Federal Reserve discount rate marks the upper limit of their fluctuations, since banks seldom choose to pay more when they can borrow at the discount rate. But in periods of strong loan demand and tight money, the Federal funds rate may rise well above the discount rate. This situation, which existed during the last half of 1965 and the first three quarters of 1966, developed from a combination of credit rationing by the Reserve banks, a relatively low discount rate, and exceptionally inviting loan and investment opportunities.

A more specific idea of the market's background is conveyed by the fact that in September 1966, total member bank legal reserves were $23,239 million while required reserves were $22,847 million, so that excess reserves were $392 million. The greater part of the excess reserves—$291 million—was held by the smaller country banks, with only $101 million in the large reserve-city banks, including New York City and Chicago.[20] It should be noted that the average size of excess reserves in the banking system materially understates the availability of Federal funds. This is true since the reserve position of each individual bank varies widely from day-to-day and within each day during the reserve computation periods—one week in reserve-city banks and two weeks in country banks. The lightning-like turnover of available Federal funds is indicated by the fact that combined purchases and sales of 46 major reserve-city banks during the first four weeks of September 1966 amounted to $19.7 billion—an annual rate of $1,022 billion.[21] More relevant to the present purpose, average borrowings of Federal funds by weekly-reporting large banks during September 1966 amounted to $5.8 billion—over two-fifths of their total legal reserve balances.[22]

The limitations of the Federal funds market as a dependable source of cyclical reserve money for the individual bank are similar in some respects to those of CD's, but there are also significant points of difference. A summary of the similarities will suffice. The first is that the banks must compete actively among themselves for existing reserve money when it is

[19] *Federal Reserve Bulletin*, October 1966, p. 1451.

[20] *Federal Reserve Bulletin*, October 1966, p. 1468; preliminary figures.

[21] *Ibid.*, p. 1470.

[22] *Ibid.*, pp. 1486-1489.

scarce during the last phase of business expansions. This may lead to a very high cost of funds, as illustrated between August and November 1966 when Federal funds typically traded at 6 percent while the Federal Reserve discount rate was 4½ percent. The other similar limitation is the fact that a bank must face the high probability of a restrictive Federal Reserve policy in boom periods whether it expects to acquire reserves through CD's or Federal funds. This magnifies the degree of reserve scarcity.

There are three significant differences between Federal funds and CD's as dependable cyclical sources of reserve money. First, the Federal fund rate is not subject to Federal Reserve regulation, nor is such regulation likely. On this count, Federal funds have a distinct advantage over CD's, which are subject to maximum rates under Regulation Q. However, the price may be too high to contemplate in practice when other alternatives to provide liquidity are considered, and under extreme conditions of restraint this source may nearly dry up at any price.

Second, there is no legal reserve requirement against the borrowing of Federal funds, whereas a reserve requirement of between 3 and 10 percent applies to time deposits. This difference has both a positive and negative aspect. On the positive side, the net cost of borrowing Federal funds is somewhat lower than the net cost of CD's when market rates are the same. But, on the other hand, there is no release of required legal reserves in the banking system when borrowings of Federal funds are increased.

Last, Federal funds are bought and sold by banks on a very short-term basis—predominantly for one day only, and seldom for more than one week, while original issues of CD's are for considerably longer periods. Most of them have maturities in the range of 3 to 12 months, although a significant part has maturities after one year and beyond two years.[23] The exceedingly short-term nature of Federal funds borrowing makes this source inconvenient and undependable for cyclical purposes.

Closely related to Federal funds, is the borrowing of reserves by smaller banks from their large-city correspondent banks. A part of such loans is made according to the prevailing practices in the Federal funds market and may therefore be included in the funds market proper. But another part is made on a customer basis under pre-arranged lines of credit, and with maturities and other terms usually arranged to meet the needs of the smaller bank. However, liquidity pressures focus on the large city banks, and consequently they are likely to be least able to provide such loans when smaller banks face cyclical reserve deficiencies.

D. Borrowing at Federal Reserve Banks

The fourth source of reserves by creation of liabilities is borrowing from the Federal Reserve. In fact, the founders of the Federal Reserve System visualized the discount window as the principal pipeline through which high-powered reserve money would be released and withdrawn from commercial banks. The use of the term, "high-powered," calls attention to the profound difference between this source and those just discussed—CD's and Federal funds. When a member bank borrows from a Reserve bank it adds, other things being equal, to total bank reserves. This multiple expansion feature does not apply to either CD's or Federal funds, since these markets deal only with existing bank reserves and do not in themselves bring forth newly-created reserves. However, both markets do have a multiple-expansion effect insofar as they bring about a more complete utilization of existing legal re-

[23] *Federal Reserve Bulletin*, April 1963, p. 465.

serves—that is, insofar as dealings through them reduce the amount of "excess legal reserves" in the banking system, or activate shifts of demand deposits to time deposits. This effect is a significant one during boom conditions when bank reserves become relatively scarce and money rates rise sharply. For example, excess reserves exceeded $700 million during the recession of 1960-1961, but as the economy recovered and interest rates rose they gradually declined, and during the first half of 1966 they were in the vicinity of $350 million.[24]

In practice, member bank borrowing at the Reserve banks predominantly takes the form of a renewable promissory note for 15 days or less secured by U.S. securities. Seldom utilized are other possible forms of borrowing, namely: (1) discounting of eligible customer notes with remaining maturities not in excess of 90 days;[25] and (2) a promissory note with a maximum maturity of four months and secured by any satisfactory bank assets. However, in the latter case a penalty rate of ½ percent above the regular Federal Reserve discount rate applies.

Regardless of the method of borrowing, the Reserve banks observe certain guiding principles in the administration of discounts and advances. Federal Reserve credit is generally granted as a privilege rather than a right to meet day-to-day and seasonal liquidity needs of member banks. Under ordinary conditions, dependence on borrowing for longer-term purposes, including cyclical loan expansion, is not regarded as appropriate. Also, advances are not to be used in support of speculative activities in securities, commodities, or real estate. Only in unusual situations arising from national or local difficulties can a member bank count on borrowing continuously for longer periods.[26] In practice, a Reserve bank seldom refuses the first application for an advance to meet a purpose in line with the foregoing principles, but a large member bank which has borrowed continuously for three or four reserve-computation periods is likely to be called on the carpet.

TABLE 3
Member Bank Borrowings and Required Legal Reserves on Selected Dates, 1920-1966[1]
(In millions of dollars)

Dates	Member Bank Borrowings at F.R. Banks (1)	Required Legal Reserves (2)	Percentages, (1) to (2) (3)
October 1920	2,780	1,815[2]	153.2
July 1929	1,096	2,292	47.8
December 1952	1,593	20,457	7.8
April 1957	1,011	18,580	5.4
August 1959	1,007	18,141	5.6
September 1966[3]	766	22,847	3.4

[1] Monthly averages of daily figures.
[2] Total legal reserves.
[3] Preliminary figures.

Sources: Board of Governors of the Federal Reserve System, **Banking and Monetary Statistics; Federal Reserve Bulletin,** various issues.

Some idea of the extent to which member banks have depended on borrowings from the Reserve banks to meet liquidity needs at cyclical peaks may be gained from Table 3. It will be noted that this dependence was very heavy in the 1920's. The record amount of borrowings occurred in October 1920, when they reached $2,780 million, or 153 percent of total legal reserves. At that time, total member bank deposits were $25.1 billion as compared with $271.2 billion in September 1966, so that a corresponding amount of borrowings in September 1966 would be $30 billion. A similar comparison with July 1929 would call for borrowings in September 1966 of $8.3 billion, in contrast with actual borrowings of $766 million. Since the second World War, Reserve bank borrowings have been modest

[24] *Federal Reserve Bulletin,* July 1966, p. 988.
[25] Nine months in the case of agricultural paper.
[26] Board of Governors of the Federal Reserve System, *Regulation A,* 1955 Revision, Foreword-General Principles.

even at cyclical peaks—never exceeding 8 percent of required legal reserves.

This marked decline in the relative importance of borrowings at the Reserve banks is largely attributable to (1) the profound change in the entire banking and financial environment, and (2) a change in Federal Reserve policy with respect to the release of reserve money through the discount window. In the 1920's, the financial environment did not provide liquidity alternatives to Reserve bank borrowing to anything like the degree that existed after the second World War. The short-term U.S. security market was relatively small, the Federal funds market had not yet developed, the negotiable CD market did not exist, the bankers' acceptance market was small and was dominated by the Reserve banks, the commercial paper market was likewise small, and there was not an active market in short-term obligations of states and political subdivisions, Federal agencies, and corporations. The large banks depended heavily on call loans to security brokers and dealers for asset liquidity. Such loans ordinarily served the purpose quite well when loans called by one bank could readily be shifted to other banks. But they became almost frozen in cyclical booms and financial crises when all banks needed additional reserves at the same time. The peak of borrowings in 1920 also reflected highly inflationary conditions superimposed upon the financing of the first World War when Treasury policy was to sell bonds directly to the public rather than to commercial banks. To support this program, banks were urged to lend to the public with U.S. securities as collateral, and the Reserve banks were encouraged to advance adequate amounts of reserve money to the banks.

In contrast with the 1920's, the short-term money markets developed enormously after the second World War. The U.S. securities market was, of course, predominant. At midyear 1947, marketable U.S. securities with maturities under one year totalled $51.2 billion, and those with maturities of one to five years amounted to $21.9 billion. By the end of August 1966, these categories were, respectively, $92.2 billion and $62.9 billion.[27] Also, significant growth took place in the bankers' acceptance market and the commercial paper market, and several new divisions of the money market developed: Federal funds, Federal agency securities, short-term municipal securities, and negotiable certificates of deposit. Thus, it is evident that commercial banks enjoyed materially wider alternatives in liquidity management after the second World War than during the 1920's. They were not so dependent for liquidity on borrowings from the Reserve banks.

The other main reason for the decline in relative importance of borrowings at the Reserve banks since the 1920's is a change in Federal Reserve policy in regard to discounts and advances to member banks. The Reserve banks have applied the rule of short-term borrowing rather assiduously, and this has apparently developed greater member-bank reluctance to borrow and to stay in debt. They have administered "discounts and advances" with a firm hand during cyclical booms when the banks have most needed reserves. They have preferred to release reserve money on their own initiative by purchasing U.S. securities in the open market and by reducing percentage reserve requirements from time to time. The best evidence of a firm policy of rationing reserve credit is the fact that Treasury bill yields have risen well above the Federal Reserve discount rate during the last phase of every cyclical expansion since the second World War, thus making it profitable to borrow. But despite the greater profit incentive, borrowings

[27] *Economic Report of the President*, January 1966, p. 275; *Federal Reserve Bulletin*, October 1966, p. 1499.

have remained at modest levels. Also, in 1965-1966, the Federal funds rate typically exceeded the discount rate by from one-half to 1 percentage point. In fact, Federal funds often traded at 6 percent during the period August-November 1966, when the discount rate was 4½ percent—a differential of 1½ percent at a time when member bank borrowings averaged only about $750 million.

E. Short-Term Notes

A fifth source from which the individual bank may acquire reserve money by the creation of additional liabilities is the issuance of unsubordinated, short-term, promissory notes. This new member of the money-market family was launched by the First National Bank of Boston in September 1964. The unsecured notes were offered in negotiable form with maturities to suit corporate and other large short-term investors. Shortly afterward, First Boston Corporation announced that it would make a market in the notes. Other large banks and security dealers followed suit, and with the blessing of the Comptroller of the Currency and the Federal Reserve Board the new market seemed to be off to a promising start.

There were significant advantages of such notes over CD's. Since they were not classified as deposits they were not subject to maximum-rate regulation (Regulation Q). For this reason, a bank could regard them as a more dependable reserve source because there was no obstacle in bidding up rates to attract or to retain funds. This constituted a special advantage for banks outside the circle of leading money-market banks. The smaller institutions had to offer somewhat higher rates on CD's to compete, and whenever market rates approached the rate ceiling they tended to lose CD's to leading banks. Another advantage of the notes was that they were officially classified as borrowed funds and not as deposits. Consequently, they were not subject to either legal reserve requirements or to deposit-insurance assessments. This represented an annual cost saving at the time of about 0.2 percent.

The only apparent disadvantages of the notes were certain legal restrictions on borrowing. A national bank was prohibited from borrowing in excess of capital stock and 50 percent of surplus, and state-chartered banks were also restricted in this regard. In addition, the banking law of New York was interpreted to bar the issuance of such notes, whether negotiable or non-negotiable. Without a legal change, this would of course seriously limit growth of the market, since the great money-market banks in New York City were excluded. In August 1965, partial relief came to New York banks when the State Banking Department ruled that *non-negotiable* short-term notes, issued for specified periods in units of $1 million or more, were permissible. With this assurance, several large New York banks sold significant amounts of non-negotiable short-term notes to corporations and others.[28] However, the prohibition of negotiable notes in New York remained a major obstacle to development of an active secondary market, and to the potential growth of the new market. Pending a permissive change in the New York banking law, it seemed improbable that a major national market could be established in view of the predominance of New York City as a financial center.

Even if the New York banking law should be amended to permit issuance of negotiable notes, their future growth is called to question by restrictive measures taken in June 1966 by the Federal Reserve Board. Effective September 1, 1966, short-term promissory notes of banks became subject to the regulations governing reserve requirements and payment of interest on deposits. The Board's

[28] *The Wall Street Journal*, September 3, 1965, p. 8.

purpose was, "to prevent future use of these instruments as a means of circumventing statutory and regulatory requirements applicable to bank deposits." [29] This action erased the advantages of such notes over CD's, except perhaps for use in individual situations. Moreover, in view of the limits on bank borrowings, the legal barrier to negotiable notes in New York, and the great head-start of the CD market, it now appears unlikely that a comparable new market in notes will develop.

Now that short-term promissory notes of banks have become subject to legal reserve requirements, the analysis of their effects on the money market becomes identical with that pertaining to CD's. That is, the individual bank may acquire liquidity through their issuance only by drawing existing reserves and deposits from *other* banks. The only difference is that the process involves a shift in the banking system from demand deposits or time deposits to note liabilities; whereas in the case of issuance of CD's there is a shift only from demand deposits to time deposits. In both cases, there is a reduction in the amount of required legal reserves when the shift is from demand deposits to a liability against which a materially lower percentage reserve requirement applies. The general conclusion is also the same as that with respect to CD's: Short-term notes are not a dependable source, except to a limited extent, to meet the liquidity needs of the individual bank during the last phase of cyclical periods of expansion.

F. Capital Funds

The sixth source from which the individual bank may acquire reserve money by the creation of liabilities is by raising capital funds in any one of several forms—sale of common stock, preferred stock, or capital notes, and retention of earnings. While these forms differ in character, the effect of their increase on the asset-liquidity position of the individual bank and the banking system is the same. When Bank A, having a legal reserve deficiency of $10 million, increases its capital funds by this amount, say by sale of common stock, its cash reserve is increased and so is its common stock account. Assuming that the stock is paid for by checks on other banks, total demand deposits of the banking system are immediately reduced by $10 million. At the same time, required legal reserves are reduced by $1.5 million when the reserve requirement is 15 percent. Given time, the released reserves provide the basis for loan and investment expansion (and therefore deposit expansion) of $10 million, so that the demand deposits initially extinguished may be recreated. Thus, the end result, assuming net free reserves of zero at the outset and full utilization of the released reserves, is no change in total demand deposits, an increase of $10 million in total capital accounts, and an equal increase in total loans and investments. It should also be noted that these transactions have made no change in total legal reserves of the banking system. Hence, the cash reserves that Bank A gained were drawn away from other banks which, collectively, are assumed to have excess reserves of $10 million—just enough to provide for Bank A's reserve deficiency. Thus, as a generalization, deposits are the immediate source of additional capital funds in the banking system, and an increase of capital funds of the individual bank causes a redistribution of existing cash reserves rather than an increase in total reserves.

Table 4 shows the changes in capital accounts of all member banks between 1961 and 1965. Over half the total increase of $6.3 billion came from retained earnings. Much dependence on this source does not seem practicable, since

[29] *Federal Reserve Bulletin*, July 1966, p. 979.

TABLE 4

Capital Accounts of All Member Banks, 1961 and 1965 (In millions of dollars)

	December 30, 1961	December 31, 1965	Increase	Percentage Distribution
Common stock *	5,512	7,002	1,489	23.7
Capital notes & debentures	16	1,553	1,537	24.4
Preferred stock	7	32	25	0.4
Surplus and other capital accounts	13,102	16,341	3,238	51.4
Total	18,683	24,926	6,288	100.0

* An unknown part of the increase in common stock took place as a result of stock dividends which capitalize surplus or undivided profits. Hence, the table over-states to that extent the raising of new capital funds in this manner, and under-states retained earnings as a source of new funds. Any discrepancies in totals are the result of rounding.

Source: Board of Governors of the Federal Reserve System, **Summary Report,** December 30, 1961, p. 3; December 31, 1965, p. 3.

in periods of increased earnings stockholders expect higher rather than lower dividends. Issuance of preferred stock may also be dismissed in view of its insignificance in the banking field, and because of the depressed level of preferred stock prices during periods of high interest rates.

The sale of common stock likewise has a very small potential for this purpose. Bank stock prices are likely to be depressed by the high interest rates associated with boom conditions. For example, the index of bank stock prices reached a peak in the third quarter of 1964 and had declined one-fourth by June 1966, while Standard and Poor's index of industrial stock prices rose 8 percent during the same period.[30] In addition, banks are often reluctant to issue more common stock because of dilution of per-share equity, and because of control considerations.

One possibility for use of common stock in this connection would be issuance at an earlier stage of the business-expansion cycle when the price is favorable, as in 1964. Proceeds could be held in short-term U.S. securities and other liquidity reserves which then offer attractive yields. But the practicability of such a program is open to serious question. Success would depend on a higher degree of accuracy in business forecasting than past experience demonstrates, and also on timely action in accordance with the forecast. Although bank officers may wish to sell common stock as part of an over-all liquidity program, the uncertainties and limitations commit it to a minor role.

Capital notes have become a major source of capital funds since December 1962, when the Comptroller of the Currency approved their issuance if they were subordinated to deposits. As shown by Table 5, between 1963 and 1965, they represented 47 percent of the increase in total capital funds and over three-fourths of total capital raised in the investment market by reserve-city banks.[31] In New York City, the proportion of the increase in total capital funds represented by capital notes was appreciably higher during the same period—58 percent. Thus, it is evident that the banks eagerly grasped the opportunity to acquire liquid funds by this method during this phase of business expansion. It afforded the

[30] M. A. Schapiro & Co., Inc., *Bank Stock Quarterly,* June 1966, p. 5.

[31] Allowing for the fact that an appreciable part of the increase in capital stock occurred by transfer from surplus and undivided profits.

TABLE 5

Capital Accounts of Reserve City Member Banks, 1963 and 1965* (In millions of dollars)

	December 20, 1963	December 31, 1965	Increase	Percentage Distribution
Common stock	3,640.2	4,237.8	597.6	23.2
Capital notes & debentures	78.4	1,294.5	1,216.2	47.2
Surplus and other capital accounts	8,959.1	9,721.4	762.3	29.6
Total capital accounts	12,677.7	15,253.7	2,576.1	100.0

* Includes New York City and Chicago member banks. Any discrepancies in totals are the result of rounding.

Source: Board of Governors of the Federal Reserve System, **Summary Report**, December 20, 1963, p. 3; December 31, 1965, p. 3.

advantage of tax-free capital at a relatively low interest cost when customer loan demands were strong.

M. A. Schapiro & Company has reported that over 200 banks sold nearly $1.8 billion of capital notes between mid-1963 and mid-1966.[32] The average interest rate was 4.56 percent, and the average maturity was 24.3 years. Most of the issues (194) were nonconvertible, but a few were convertible into common stock. One aspect of the compilation has special significance for this study. During the first half of 1966, only 12 capital note issues totalling $43.7 million were sold. This compares with 100 issues in 1965 amounting to $863.9 million, and 82 issues in 1964 totalling $642.9 million. The principal explanation lies in the sharp tightening of the investment market in 1966—when the average rate on the issues was 5.31 percent compared with 4.60 percent in 1965. Understandably, the banks were reluctant to commit themselves to a high fixed-interest charge for periods ranging from 15 to 30 years. This situation illustrates a serious limitation on capital notes as a method of acquiring liquidity during the last phase of cyclical expansions. However, the experience of the period, 1963-1965, does indicate that capital notes may be utilized during earlier stages of an economic expansion as part of an over-all cyclical liquidity program. Capital funds may then be raised on a favorable basis in larger amounts than currently needed, looking forward both to growth and the next cycle peak. Proceeds labelled for liquidity needs could be invested in liquidity reserves.

G. The Eurodollar Market

A final source of reserves for the large money-market banks is the Eurodollar market. This market deals in interest-bearing time deposits, denominated in dollars, on the books of large foreign banks—largely in London, but also in other European financial centers. Eurodollars originate when the holder (usually a foreign bank or firm) of a demand deposit in a U. S. bank transfers funds to a foreign bank with instructions to open a Eurodollar account. This transaction leaves the foreign bank with a new dollar liability in the form of a time deposit, and a counterpart demand deposit on the books of the U. S. bank. Thus, the foreign bank has become an intermediary between the original owner of the demand deposit and the U. S. bank. Having a claim on dollars, the foreign bank is then in position to make loans to others who wish to borrow dollars—whether they be foreign business firms and financial institutions, or U.S. banks and other interests.

While European banks accepted and transferred deposits in dollars (and other

[32] *Bank Stock Quarterly*, June 1966, pp. 8-12.

foreign moneys) as far back as the post-World War I years, this market had its real beginnings in the mid-1950's and most of its development took place after 1958. According to estimates of the Bank for International Settlements, the gross Eurodollar deposit liabilities of the eight principal European countries [33] at mid-1966 were $11.5 billion and the net amount was $10 billion. The rest of the world, mainly Canada and Japan, accounted for another $1 billion.[34]

The reasons for the growth of this market, its complex features, functions, and outlook represent a long story which cannot be told here. Suffice it to say that one of its principal functions is to provide an international money market for the leading banks of all major nations—a market where they can place excess funds and where they can usually obtain needed liquid funds. This is the aspect which is relevant for the present purpose.

During 1965 and 1966, U.S. banks experienced growing liquidity pressures, largely from the upsurge in loan demands, outflows of currency and gold, and increasing restraint by the Federal Reserve. Individual banks met these pressures by tapping the various liquidity sources already discussed. In addition, according to official estimates, the large banks turned to the Eurodollar market—in the net amount of $2 billion during 1965 and the first quarter of 1966.[35] Such borrowings apparently continued to grow rapidly during the remainder of 1966, as indicated by the fact that short-term liabilities of U.S. banks to Europe increased by $3.2 billion between March and November 1966.[36]

In an immediate accounting sense, borrowing in the Eurodollar market by a U.S. bank does not represent a net addition to the reserves of the banking system. This follows from the fact that Eurodollars have demand deposit counterparts on the books of U.S. banks.[37] A change in ownership of a Eurodollar time deposit from one foreign owner to another brings about a corresponding shift of U.S. demand deposits, usually from one bank to another.

But, more basically, it is possible that borrowing in the Eurodollar market by U.S. banks may lead to an improvement of the reserve position of the domestic monetary and banking system. This would take place (1) if the Federal Reserve banks purchase foreign moneys by expanding their credit, such as in recent swap arrangements with foreign central banks; (2) if Federal Reserve credit is extended domestically in any manner; (3) if the Treasury borrows foreign moneys from the International Monetary Fund; and (4) if the Treasury or the private sector of the economy borrows more heavily abroad. Thus, it may be that increased borrowing by U.S. banks in the Eurodollar market will generate a train of circumstances leading to an increase in the total reserves of the banking system, and to an increase in the size of the Eurodollar market.

Dealings in the Eurodollar market are in wholesale lots with a minimum of $1 million, and with most single transactions in tens of millions. Direct access to this market is beyond the reach of small- and intermediate-size banks, and indirect access through correspondents involves uncertainties. But the Eurodollar market

[33] United Kingdom, Switzerland, Sweden and the five Common Market countries—Belgium, Netherlands, France, Italy, and West Germany.

[34] Milton Gilbert, "The Euro-Currency Market," Bank for International Settlements, H. S. 383, p. 4.

[35] Bank for International Settlements, *Thirty-Sixth Annual Report*, June 1966, p. 149.

[36] *Federal Reserve Bulletin*, April 1967, p. 668.

[37] In some cases, the Eurodollar counterpart is a loan payable to foreign banks by U.S. banks.

is, within limits, a potential source of cyclical liquidity for large money-market banks. International monetary conditions, however, are subject to unpredictable changes in larger measure than are domestic conditions. The supply of Eurodollars may shrink when needs are most imperative, and even if available their cost may become prohibitively high. During 1965 and the first half of 1966, the three-month rate in London on Eurodollars averaged about ½ percentage point higher than that on CD's in New York, and on occasion the spread became as much as one percent.[38]

H. Summary and Conclusion

The potentialities of liabilities management as a source from which the individual bank may meet liquidity needs during the last phase of periods of cyclical expansion may be summarized as follows:

1. All sources with the exception of Federal Reserve borrowing have in common the fact that, assuming a fixed stock of legal reserves, the individual bank can acquire reserves only at the expense of other banks in the system.[39]

2. However, an individual bank may utilize any one of these sources as a means of capturing a larger share of total existing reserves.

3. The tight credit policy typically adopted by the Federal Reserve authorities during boom conditions strictly limits the availability of reserves, and may bring about an absolute reduction in total reserves. Therefore, the bank that needs more reserves at such a time is confronted with a highly-competitive situation in which other banks are also seeking more reserves.

4. The acquisition of demand deposits cannot be counted on as a source of cyclical liquidity because banks are prevented by law from paying interest on such deposits.

5. CD's and other time deposits are not dependable sources, except for short-term liquidity needs (including seasonal), to meet requirements in the first half (or even three-fourths) of a cyclical expansion period. The unique reason for this is the probability of maximum-rate regulation by the Federal Reserve Board.

6. The exceedingly short-term character of Federal funds, and their scarcity during boom conditions, largely restrict their employment to day-to-day, week-to-week, and seasonal adjustments of a bank's liquidity position.

7. Borrowing at the Federal Reserve has traditionally been reserved by law and policy for short-term and emergency purposes.

8. Rate regulation largely eliminates the sale of short-term notes as a dependable source of cyclical liquidity.

9. Common stock or capital notes may represent a source of cyclical liquidity if they are sold before the last phase of a cyclical expansion. The markets for both bank stock and capital notes are usually depressed during boom conditions by the sharp rise of interest rates. In view of the general reluctance of banks to sell additional common stock, the issuance of capital notes has a materially larger potential for this purpose.

10. The Eurodollar market merits a limited place in the cyclical liquidity program of a large money-market bank.

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[38] Bank for International Settlements, *Thirty-Sixth Annual Report*, June 1966, p. 150.

For more comprehensive treatments of the Eurodollar market, see G. Carroll Martenson, *The Euro-Dollar Market*, Boston: Bankers Publishing Co., 1964; Norris O. Johnson, *Eurodollars in the New International Money Market*, New York: First National City Bank, 1964; Bankers Trust Company, *The Euro-Dollar Market*, 1964; Ernest Bloch, "Eurodollars: An Emerging International Money Market," New York University, *The Bulletin*, No. 39, April 1966; Paul Einzig, *The Euro-Dollar System*, New York: St. Marten's Press, 1964.

[39] This generalization is subject to the qualification that issuance of CD's involves a shift from demand to time deposits and therefore releases required legal reserves.

If the management of bank liabilities can make only a limited contribution to cyclical liquidity, by what methods can a bank provide for this essential need? Briefly, the answer lies in the management of asset liquidity. This may involve some loss of current income during the greater part of a cyclical expansion, but it is likely to avoid a far greater capital loss during the last phase of expansion. The essence of asset-liquidity management is to equate the probable earlier loss of income with the subsequent probable capital loss, taxes considered.

►E. RAY CANTERBERY

A Dynamic Theory of Foreign Exchange

There has been renewed interest in foreign-exchange economics and empirical studies of capital flows in recent years.[1] This revitalization of an area largely neglected since the 1930's has paralleled American and British concern with balance-of-payments policy since the late fifties. Major issues have in-

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[1] Recently published studies include Philip W. Bell, "Private Capital Movements and the U. S. Balance of Payments Position," *Factors Affecting the United States Balance of Payments,* compilation of studies prepared for the Subcommittee on International Exchange and Payments, Joint Economic Committee, 87th Congress, 2nd Session, 1962, pp. 395-482; Peter B. Kenen, "Short-term Capital Movements and the U. S. Balance of Payments," *The United States Balance of Payments,* Hearings before the Joint Economic Committee, 88th Congress, 1st Session, Part I, 1963, pp. 153-191; Jerome L. Stein, "International Short-term Capital Movements," *The American Economic Review,* LV, March 1965, pp. 40-66; John Spraos, "The Theory of Forward Exchange and Recent Practice," *The Manchester School of Economic and Social Studies,* XXI, May 1953, pp. 87-117; A. E. Jasay, "Bank Rate or Forward Exchange Policy," Banca Nazionale del Lavoro *Quarterly Review,* XLIV, March 1958, pp. 56-73; S. C. Tsiang, "The Theory of the Forward Market," *IMF Staff Papers,* VII, April 1959, pp. 75-106; Herbert G. Grubel, *Forward Exchange Speculation, and the International Flow of Capital,* Stanford, California: Stanford University Press, 1966.

cluded the use of higher short-term interest rates in each nation, and the possible implementation of a wider "gold band" in an attempt to slow or curb short-term capital outflows. Implicit in payments-policy statements from some central banks is the assumption that a higher short-term domestic interest rate will not only have the desired consequences, but is a policy having no acceptable substitute.

Conflicting conclusions and controversy have marked academic thought on foreign-exchange policies. Now, however, there appears to be a consensus developing around models of the type advanced by Jerome Stein, Peter Kenen and S. C. Tsiang. These models refute the traditional interest-rate-parity doctrine pioneered by John M. Keynes and elaborated by Paul Einzig.[2] This is not to say that interest-rate-parity purists no longer exist, but rather to argue that these defenders and practitioners of parity have strong theoretical and empirical sources of opposition.

Kenen and Stein have concentrated on the empirical. For this reason, their models cannot include *all* foreign-exchange transactions. The data simply are not available. Others, such as Spraos and Tsiang, have emphasized the forward market and forward-market policy in partial equilibriums, and hence have not included all transactions. Herbert Grubel has tested both interest-rate and speculative foreign-exchange variables separately, but not together.[3] His theoretical sketches are in geometric form and are based on partial equilibriums. Either in spite of or because of the partial nature of these analyses, most of the results—excepting possibly Grubel's conclusions on interest-rate sensitivity—appear to be in the same stream of international financial thought.

The intent of this paper is to develop further a systematic theory of foreign exchange which ultimately can be tested (or has indirectly been tested) empirically and which has policy applicability. The model is based more on the pioneering work of Stein than on any other contributors. At the risk of appearing slightly immodest but in the hope of gaining the reader's confidence, the author can list several innovations or improvements herein. This model is more general than any known published ones. Nonetheless, if one ignores the lagged variables, the model's solutions are consistent with the findings of Stein, Kenen, and Tsiang. Some might raise the question of whether this trip through theory is then really necessary. Even if the scholar could afford to be so presumptuous, serious doubts prevail among economists because of the partial nature of existing models and the incomplete coverage of various transactions. Moreover, the incremental parts of a model—such as the marginal propensity to save of the rich in the Keynesian income model—may have a significance apart from the general solution. For one thing, uncovered interest-rate arbitrage flows are usually dealt with lightly, if at all.

This is a mathematical model with time as a variable, providing detail which escapes geometry with its two dimensions and the statistical model which is conceived in part (and necessarily) by the constraint of data availability. The use of time also enables one to specify the expected future spot rate as endogenous. It also shows how the solution to a model for importers and exporters alone is no different *in form* from a solution for financial institutions *plus* traders. Finally, the precise form of the solution for the forward premium has widely-ignored but highly-surprising implications for central bankers who wish to control short-term capital flows by ma-

[2] See Paul Einzig, *A Dynamic Theory of Forward Exchange*, London: St. Martins Press, 1961.

[3] See Grubel, *op. cit.*

nipulating interest rates. This effect cannot be derived from Stein's model even though his final statistical equation (which he tested) is of a form identical to the forward-premium solution herein.

It is not argued that all possible foreign-exchange transactions are specified in this model. If so, the mathematics would be too cumbersome. But wherever specific transactions are excluded, the reason is stated and in all cases the exclusions do not alter the substantive conclusions.

I. The Modern Exchange Market Versus Keynes

Keynes' well-known doctrine states that "funds available for short-term investment will be placed in that money market which yields the greatest return."[4] All else being equal, the interest rate on money lent or deposited for short periods in the money markets of any two nations would be the "most fundamental cause" attracting or repelling funds.

Capital flows between two countries through interest-rate arbitrage would bring about an equilibrium relationship among (a) the spot and forward rates in each nation and (b) short-term interest-rate spreads between them. Interest arbitrage was an important force in exchange-rate stabilization.

Keynes' interest-rate parity concept is, on the surface, the theoretical rationale for a policy of raising domestic short-term interest rates during payments deficits. But the applicability to the modern-day exchange market of this precept's assumptions raises some doubts.

A. The Assumptions of Parity

Some of the Keynesian assumptions, both explicit and implicit, *are* still useful.[5] It is a two-nation model. The only maturity traded forward is the three-month contract. The Treasury-bill rate in each country is a proxy variable for all 90-day rates including the lending rates. Both types of arbitrage affect the forward exchange rate in the same direction. The spot market is the current market for exchange, and the transactions cost of exchange (service charge or difference between dealer's buying and selling price) is negligible or cancelling between the two areas.

But at least five constraints, today, invalidate any concept of a stable interest-rate parity. The Keynes (or Keynes-type) model implicitly assumes:

1. The supply of arbitrage funds is "sufficient" to achieve interest-rate parity.
2. There are no exchange restrictions, and no expectations regarding the future imposition of retroactive controls.
3. The probability of devaluation or revaluation of either currency is zero.
4. The operation of the key-currency role by the United States and Great Britain does not alter exchange-rate expectations.
5. The political climate in each nation is equally favorable for the transfer of funds.

These qualifications, in fact, determine the variables of an exchange model and the relative magnitude of its parameters, the coefficients which relate changes in these variables to the quantities demanded and supplied of foreign exchange.

Among the limitations on potential lending or investment arbitrage resources,

[4] John M. Keynes, *A Tract on Monetary Reform*, London: Macmillan and Co., 1923, p. 124.

[5] The acceptability of these assumptions is discussed in E. Ray Canterbery, *Foreign Exchange, Capital Flows and Monetary Policy*, Studies in International Finance Series, Princeton: Princeton University Press, 1965, p. 26.

are domestic opportunity costs, restricted portfolio liquidity, and the reluctance of certain companies and commercial banks to become "involved" in foreign exchange. Added to these constraints would be central bank attempts in deficit nations to discourage interest arbitrage.[6]

Expectation of exchange restrictions, the probability of changes in the price of gold, and political stability often are interrelated. Expectations of change *or stability* frequently can cause lapses from interest parity. Indeed, knowing that member nations of the IMF attempt to retain par values in terms of gold is helpful to the potential speculator. This has been termed the "concept of speculative confidence."[7] Pure speculators in the major currencies today need be concerned mostly with appreciation-depreciation of spot exchange rates within stabilization limits, and appreciation-depreciation of relatively-free forward rates. At the same time, relatively-fixed spot rates facilitate uncovered arbitrage, which is in part a form of passive speculation.[8]

With the exception of relatively-fixed spot exchange rates, there currently are no *direct* exchange controls in the United States. Although the forward market in most nations is free, the U. S. Treasury did begin limited operations in forward exchange in March 1961, and in February 1962 the Federal Reserve began buying and selling foreign exchange in various maturities on its own account. The drafting in mid-1963 of a bill to tax purchases of foreign securities, although not an overt exchange regulation, had the effect of reducing foreign security sales and consequently the demand for foreign exchange.

But it is other nations which have explicit exchange controls. Undoubtedly, this places considerable pressure on the highly accessible money and capital markets of the United States. As a result, borrowers are attracted in spite of higher rates than those prevailing elsewhere, and lenders in spite of lower rates. The assumption of political stability implies again that capital flows are solely a function of interest rates.

Clearly, the concept of interest-rate parity explains capital movements only under the assumption of an adequate supply of arbitrage funds, absence of exchange restrictions, no speculation, and stable political climates. By definition, these are the conditions which prevail during a "normal" period.[9] But there are severe restrictions on the supply of arbitrage capital, exchange controls are omnipresent and speculation is sometimes dominant.[10] According to the concept of speculative confidence, one form of "speculation" becomes such a safe transaction that the usual definition seems stretched. Recent gold and foreign-exchange movements suggest that "normal" periods are so scarce as to be exceptional.

B. The Modern Model's Assumptions

The traditional assumptions deemed acceptable and reasonable may be retained. Only two nations are involved, the Treasury-bill rate is the proxy variable for all interest rates. The spot market is the current market for exchange, transactions cost is negligible or cancel-

[6] These conditions are detailed in Canterbery, *op. cit.*, pp. 27-29.

[7] *Ibid,* pp. 30-32.

[8] For the complete development of an uncovered-arbitrage function, see *ibid,* p. 36.

[9] The "normal" period is defined by Jerome Stein, *The Nature and Efficiency of the Foreign Exchange Market,* Essays in International Finance, No. 41, Princeton: Princeton University Press, October 1962, p. 28.

[10] Potential arbitrage capital comes from the home nation. In the United States, the domestic money supply in part determines the availability of dollars for the purchase of foreign exchange. The domestic rate of interest usually reflects the availability of such funds.

ling, initially there are no direct exchange restrictions. In this analysis, the spot exchange rate is allowed to move between its upper and lower support limits.

Two conventional assumptions are dropped entirely and become notable exceptions. A central bank constraint imposes a limit on the level of potential arbitrage reserves, and the speculative motive is introduced. Speculation regarding the future value of foreign exchange takes place, either through expected appreciation or revaluation, and the potential supply of funds for covered arbitrage is reduced even more.

Beyond the characteristics from parity theory, several constraints are added. The major ones are listed below. A few additional—but minor—assumptions are introduced at more appropriate junctures.

1. The absolute levels of exports and imports are exogenous, and given.
2. Importers, exporters and all other firms engaged in foreign exchange dealings attempt to maximize profits. (This is no different from the profit-maximization assumption of traditional price theory.)
3. Importers either pay for all imports of goods and services immediately or pay the balance in the next period.
4. It is assumed, quite realistically, that the monetary authorities in the respective nations have considerable control over Treasury-bill rates. Because these rates are insulated from international capital flows, these two variables are also exogenous to the model.
5. The *spot* foreign-exchange rate becomes a constant at the upper-lower limits. This is a very simple way of specifying the activities of the exchange stabilization funds.

It is necessary to suggest several hypotheses. Although the exact quantities of exchange moving in arbitrage or speculation cannot be determined (in pure theory), a testable solution can be derived from hypotheses regarding the coefficients relating changes in the independent variables and advances of arbitrage and speculation funds.

It is believed that the response of speculative demand to given changes in price expectations is very high under the condition of increased confidence regarding a fixed relation between gold and the major currencies. The potential loss for a speculator is minimal, while the expected gain can be very great. In view of the institutional restraints, the sensitivity of interest-rate arbitrage to changes in the covered interest-rate differential is lower. On the other hand, the demand responsiveness of uncovered arbitrage, with its attendant risks for ordinarily conservative arbitrageurs and the imposed 30-day, 90-day or longer commitment for pure speculators, is assumed to be even less. But this does not cause uncovered arbitrage to be minimal, especially compared to alternative systems. Under a flexible exchange-rate system, for instance, uncovered interest arbitrage probably would be negligible.

An "abnormal" period is one in which the market believes the payments deficit to be chronic, a situation not unlike that prevailing in the United States and Great Britain during the 1960's. But a distinction is made between an abnormal period with passive speculation and an abnormal period of pure speculation.[11] In order for an abnormal price period to become speculative, the rejection of perfect cer-

[11] This is a distinction not made by Stein, *op. cit.*

Some forms of speculation are often referred to as "exchange arbitrage." But true *exchange* arbitrage occurs in a nearly simultaneous three-way transaction wherein exchange dealers observe a temporary (and momentary) inconsistency in exchange rates among countries. While this transaction is excluded from the model developed herein, buying and selling exchange for profits in different maturities is included as a form of pure speculation. See Grubel on triangular arbitrage, *op. cit.*

tainty concerning revaluation is necessary, but not the acceptance of absolute uncertainty. The only specification regarding expectations during a period of passive speculation is that devaluation of the currency purchased (in terms of gold) is not probable within 90 days (or other period of maturity). This suggests that speculation can take place both when *no* devaluation is expected (passive) *and* when devaluation *is* imminent (pure).

Uncovered arbitrage is likely to accompany speculation to the extent that the interest arbitrageurs believe that the exchange rate will not move against them *within the next 90 days* (or other relevant forward maturity).[12] Such arbitrage, which has in part a speculative motive, is more destabilizing to the forward-exchange market (that is, moves the forward premium away from parity) than is pure speculation to the spot market. Because of the thinner forward market, a sudden reversal in the usual covering process can cause the forward rate to jump sharply upward.

II. Determination of Export-Import Demand

Most frequently, export-import volume is said to be related to levels of real aggregate income (Y) in any two trading nations. Of course, several secondary variables usually are mentioned, including the average price of exports-imports (P), levels of real wealth (W), the average price of all other goods ($\hat{p}$), levels of consumer tastes (T), and in a free-exchange market, the current price of foreign exchange (x). Thus, in the home country the absolute level of imports (M), and exports (X), for instance, can be expressed by the following notations:[13]

$$M = f(Y_m, P_a, W_m, T_m, \hat{p}, x),$$
$$X = g(Y_a, P_m, W_a, T_a, \hat{p}, x), \qquad (1)$$

where the subscript $_m$ denotes the home nation and $_a$ denotes the foreign importing nation.

In a fixed, or relatively-fixed exchange-rate system, however, the spot exchange rate is not allowed to move more than a minimal amount. The forward rate usually moves freely. These narrow exchange-price movements have no appreciable effect on physical export-import volume. The free-market function minus the exchange-rate variable expresses this new relationship:[14]

$$M = f(Y_m, P_a, W_m, T_m, \hat{p}),$$
$$X = g(Y_a, P_m, W_a, T_a, \hat{p}). \qquad (2)$$

While minor changes in the exchange rate do not alter the volume of goods and services traded, they do affect the timing of purchases and sales of exchange. In the exchange market with upper-lower limits to spot-price fluctuations, the behavior of exporters and importers in great part parallels that of others who demand foreign exchange.

In short, under relatively-fixed exchange rates, either national incomes must be changed, or short-term capital flows incited to restore "equilibrium" in a disturbed exchange market.

Barring a generally deflationary economic policy, what are the prospects for balance-of-payments stabilization via short-term capital flows? With the choices of importers and exporters nar-

[12] This hypothesis is recognized as a slight modification of the original interest-rate-parity assumption of no devaluation or revaluation, and is based on the concept of speculative confidence.

[13] The main variables of the model appear in the table.

[14] Alternatively, the exchange rate could be included as a constant; it would change only as the par value of one of the currencies is adjusted.

TABLE
Mathematical Symbols

Exogenous Variables

X .....volume of exports, in terms of foreign currency
M .....dollar volume of imports
v .....foreign Treasury-bill rate, percent per annum, j-days maturity
u .....domestic Treasury-bill rate, percent per annum, j-days maturity
m .....interest-rate spread (foreign minus domestic rate)
$$m=v-u$$
r .....covered interest-rate differential
$$r=z+m$$

Endogenous Variables

D .....flow of spot foreign exchange demanded
S .....flow of spot foreign exchange supplied
D′ .....flow of forward foreign exchange demanded
S′ .....flow of forward foreign exchange supplied
x .....spot foreign-exchange rate (daily)
$x^{\bullet}$ .....expected rise (+) or fall (−) in spot foreign-exchange rate, percent per annum $x^{\bullet}(t)=365/i\{A[x(t-1)-x(t-2)/x(t-1)]\}$, where i is number of days foreign exchange held
y .....forward exchange rate, contract of j days
z .....forward premium (+) or discount (−), percent per annum
$z=365/j[(y-x)/x]$

Time Designation

t+h .....discrete, unknown time period

rowed to the *timing* of their purchases and sales of exchange, the quantities of exchange demanded and supplied *by* traders of goods and services is endogenous and the absolute levels of export-import volumes exogenous. Thus, it is assumed that exchange-rate changes do not influence export-import volume except to alter the *foreign-exchange value* of imports by only a multiple of the exchange-rate movement. Export and import levels provide the initial stocks of exchange, while foreign-exchange-demand functions determine flows.

This does not preclude the applicability of this theory of foreign exchange (with minor changes) to a free-exchange market. If, indeed, exports-imports are not sensitive to *substantial* price movements, trading volume can still be viewed as determined by outside forces during normal periods. On the other hand, if equation (1) is carefully specified, it can be incorporated into the dynamic model.

A. The Equilibrium Exchange Rate

Equilibrium on trade account is achieved if the two volumes, expressed in terms of the *same* currency units, are equal. This can be expressed as

$$M(1/x)-X=0. \tag{3}$$

Import volume (M), which is expressed in dollars, is converted to its foreign-exchange value by multiplying by the reciprocal of the foreign-exchange rate. Export volume (X) is already expressed in terms of the foreign currency. The exchange rate (x) is at whatever level necessary to meet the equilibrium

requirement. Solving for the exchange rate yields the ratio,

$$x = M[X]^{-1}. \tag{4}$$

Under a freely-fluctuating exchange-rate system with perfect competition, this exchange rate would be consistent with equilibrium as defined in equation (3).

Under the current system of relatively-fixed exchange rates, it is fortuitous if the market rate is identical with this equilibrium price. Hence, the likely relationship on trade account is $M(1/x) \neq X$.

Among other reasons, this results because of the absence of an adjustment mechanism for imports-exports. As is customary, the model developed herein views direct investment, portfolio investment and foreign aid as exogeneous (although the exchange costs of these transactions could be summed with those of commodity exports and imports). Suppose military grants abroad cause the home country's payments to rise. This outside force also could exercise upward pressure on the natural-market exchange rate, leading to an excess supply of foreign exchange. If the new natural-market rate—for whatever reason—tends to be above the pegged upper limit under the current gold-exchange system, the foreign central bank will have to buy exchange (selling its own currency) so as to maintain the desired ceiling.

B. The Timing of Exporters and Importers.

There are four general alternatives for importers:

1. pay for imports immediately by engaging in a spot transaction;
2. postpone payment by engaging in a forward transaction (hedge);[15]
3. postpone payment and speculate on the price of exchange either by pure speculation or uncovered interest-rate arbitrage;
4. postpone payment and engage in pure interest-rate arbitrage.

It is, of course, possible to exercise some combination of these choices. For instance, the dollar value of a particular export or import may not be entirely "hedged."

Given these options, the original quantity of exchange needed for pure trading purposes will represent only one part of total foreign-exchange demand. It is argued that the ancillary transactions of the commodity traders are functions of the expected change in the spot rate (x^*), of the forward premium (z), and of the interest-rate differential (m).[16]

[15] An expected foreign-exchange receipt also can be "covered" by exporters. For instance, U. S. exporters could sell an equal quantity of German marks forward as a perfect hedge for the receipt of marks. Likewise, German exporters could be selling dollars forward (buying marks). This would be an alternative to the importers buying foreign exchange forward to cover these transactions. The latter is the more simple transaction and is the one used in this paper. Because foreign exporters who expect to receive another currency and home-country importers who are paying in foreign exchange are both hedging against the same movement in the exchange rate, the spot-forward transactions tend to leave the spot rate unchanged. Although both types of hedging lead to changes in demands and supplies in the forward market, the solutions to the forward supply and demand equations would be identical in form.

[16] More precisely, the expected change in the spot price is equal to the expected spot price minus the previous spot price in percent per annum terms, that is,

$$x^*(t) = 365/i[(x^e{}_t - x_{t-1})/x_{t-1}],$$

where x^e is the expected spot price. The value of the expected spot price (x^e) is not as elusive as it first seems. In a commodity market, the expected price usually is assumed to be some function of past prices. This concept may have more relevance to the exchange market than to the commodity market.

Consumers and producers who speculate against price changes have a greater budget constraint than speculators in foreign exchange.

If importers purchase forward exchange, the bankers and, in turn, the foreign-exchange dealers, will enter the market to supply the exchange spot in the next period. The total demand for exchange will depend upon current purchases of foreign exchange by importers plus the purchases of imports in the preceding period which were not paid for at that time.

Thus, the importer's demand for foreign exchange by the home country in period t is:

$$D(t)=M_t(1/x)+f(x^{\bullet}_t, z_t, m_t)+[f(x^{\bullet}_{t-1}, z_{t-1}, m_{t-1})]. \quad (5)$$

A rising expected price usually causes importers to "lead" in their purchases of foreign exchange, and enter the forward market. If outward interest-rate arbitrage was profitable in the preceding period $(t-1)$, some of the foreign exchange intended for the financing of imports will have been diverted into short-term investments. Some imports would always be paid for currently and the lagged part of the equation could never be zero or less.[17]

Similarly, the supply of foreign exchange at time t incited by export activity is:

$$S(t)=X_t-g(x^{\bullet}_t, z_t, m_t)-[g(x^{\bullet}_{t-1}, z_{t-1}, m_{t-1})]. \quad (6)$$

The third term represents the value of last period's exports that are just being paid for now. These functional relations explain the resultant behavior only of exporters and importers.

Making the usual profits-maximization-motive assertion, these relationships can be expressed in more precise terms. Pure speculation is related to the expected change in the spot rate $(x^{\bullet})$. The higher the expected future value of spot exchange, the greater the potential profits from holding foreign exchange today. In

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Exchange speculation is based mainly on observed past price behavior and rumors regarding revaluation. The former is the only tangible factor of the two and often evokes the latter.

Using the commodity market corollary, the expected price of spot exchange is:

$$x^e(t)=x(t-1)-A[x(t-1)-x(t-2)].$$

In this equation, the second term is zero when $x(t-1)=x(t-2)$. Substituting this equation for x^e,

$$x^{\bullet}(t)=A[x(t-1)-x(t-2)].$$

The righthand side of this equation can be substituted wherever the expected spot price change $(x^{\bullet})$ appears in the subsequent equations.

Several qualifications can be added to this expected-price concept. If the idea of a "normal" price is strong, the position of the current price relative to the "normal" price will influence expectations. Also, consideration of the factors causing price changes will be of some importance to the speculator.

The above formulation is consistent with the concept of speculative confidence, but does not fully explain it mathematically. The expected price change can be zero and uncovered arbitrage capital will flow in response to a certain interest-rate differential. The subsequent uncovered-interest-arbitrage function accounts for this, but the reason for the flow is in part psychological and not explained entirely by the positive interest-rate spread.

[17] The mathematical purist might argue that signs are irrelevant in these structural equations. Signs are used here, however, to indicate the behavior of the exporters and importers. Because, in the final analysis one is dealing with net supplies or net demands, the signs in equation (5) could be made identical to those in equation (4) and the equilibrium solution (and its signs) would be no different.

Foreign exchange presents some unique problems. If the reciprocal of the foreign exchange rate, $(1/x)$, were used in the functional notations, in terms of the mathematics there would be two exchange-rate variables when in fact it is known to be only one.

The levels of imports and exports are, as explained above, exogenous and are identities. In the functions, the only exchange-rate variables are the foreign-exchange rates from the view of the home nation. This means, of course, that commodity and service traders in the foreign nation tend to react in a way opposite that of home traders to the *same* changes in the exchange-rate variable.

this speculation, it is presumed that opportunity cost is not significant, for the choice is between either paying for or postponing payment on exports or imports, and between holding inventories of foreign exchange or drawing them down.

Uncovered interest-arbitrage is a function of the expected spot-price change and the interest-rate spread $(v-u)$.[18] If the foreign Treasury-bill rate exceeds the domestic, and the spot price is not expected to move against the arbitrageur, the speculative risk of remaining "uncovered" could yield a windfall profit in excess of the interest differential earned. Given a relatively assured lower limit to the international value of the dollar, institutions will invest without cover if the maximum potential decline in the spot price of foreign exchange is less than the interest-rate spread (m). They also may invest *sans* cover if the spot rate is at the upper limit for prolonged periods.

Covered arbitrage by importers-exporters is a positive function of the covered-interest-rate differential; that is, the interest-rate spread (m) plus the cost of cover (z). Given a foreign Treasury-bill rate greater than the U. S. Treasury-bill rate, an increase in the cost of cover will diminish outward interest arbitrage. Both interest-rate functions include the proxy for opportunity cost; that is, the Treasury-bill rate (u), which is the alternative return on a virtually riskless security. According to Keynes' interest-rate-parity theory, the covered-interest-rate differential $(z+m)$ tends toward zero. But the greater this differential initially, the more will be potential profits from interest arbitrage.

Hedging volume will depend mainly upon the expected rise $(+)$ or fall $(-)$ in the spot rate. For simplicity, hedging is assumed to be a function of the spot-rate change only.[19] If, for instance, the importer expects foreign exchange to be more expensive in the future, the trader may buy quantities of foreign exchange from the forward market today at a known price. An increase in hedging leads to a postponement of payment for some imports until the next period. Because the main business of exporters and importers is in commodities, it is assumed that hedging volume will exceed speculative volume in response to any expected spot exchange-rate change.

Constants adopted in expressing each functional relation are: pure speculation, η; uncovered interest-arbitrage, ∂; covered interest-arbitrage, μ; and hedging, β. These coefficients primed relate to exchange supply, and result from motivations in the foreign country similar to

[18] This assumes that changes in the domestic bill rate do not directly cause changes in the expected spot price. Usually this is the case. There are at least two exceptions. If the interest rate is raised so high abroad that speculators at home believe that the foreign money supply and, in turn, economic activity will be severely curtailed, their expectations regarding the future spot price are revised upward. There also are times when monetary policy changes alter, in an unpredictable way, these expectations. While raising the British Bank Rate to 7 percent in November 1964 did not appear to slow speculation against the pound, the subsequent *lowering* of the Rate in Spring 1965 did appear to add to confidence in the currency. This latter set of circumstances is rare. Usually, one would expect no alteration in currency-price expectations when the Bank Rate is changed slightly.

[19] Foreign exchange inventories also are sometimes hedged. But in the case of trading firms, this exchange has been earned on exports of a prior period, and in the current period comprises part of the existing stock of foreign exchange. There is little advantage in holding large inventories of a foreign exchange obtainable from a commercial bank—as most are—unless the firm is anticipating appreciation of a particular currency. In turn, if the expected spot price is higher than the current price, then firms may accumulate exchange on an uncovered basis; this activity would be a part of the speculative function. In the model developed herein, it is assumed that accumulated nonbank foreign exchange holdings of a prior period, say $t-1$, do not enter the foreign-exchange market.

those in the home nation. There is sufficient parallelism between these two sets of notations to cause the relative sizes of coefficients in each nation to be similar. Thus, it is hypothesized both that $\beta > \eta > \mu > \partial$ and $\beta' > \eta' > \mu' > \partial'$. In terms of the responsiveness of exchange demand and supply to changes in the relevant variables, speculation ranks second, followed by covered interest-rate arbitrage and, in turn, uncovered interest-arbitrage. (The rationale for these relative magnitudes is presented in Section I). Because increases in the foreign covered-interest-differential and the foreign uncovered-differential result in a rising demand for foreign exchange, these constants are positive for the importing nation, whereas the hedging coefficient is negative.

The functions are:

Pure Speculation

$$M_s = \eta x^*, X_s = -\eta' x^*. \tag{7}$$

Uncovered Interest-Arbitrage

$$M'_s = \partial(x^* + m), X'_s = -\partial'(z + m). \tag{8}$$

Covered Interest-Arbitrage

$$M_i = \mu(z + m), X_i = -\mu'(z + m). \tag{9}$$

Hedging

$$M'_i = -\beta x^*, X'_i = \beta' x^*. \tag{10}$$

These functions can be simplified without altering the final outcome. In the case of uncovered interest-arbitrage, the expected rate of change in the spot rate is the dominant variable, and such actions take a form similar to that of speculation. While profits are augmented by any interest-rate differential, they are magnified by any rise in the foreign-exchange price. Although the interest-rate differential is important, dropping the interest spread (m) in this function has no substantive effect on the solution to our problem. Hence, this variable will be dropped from the uncovered-arbitrage function for mathematical simplicity.

Now there are three functions with the expected price change as the dominant variable which can be expressed as one. The newly-designated coefficient, §, is negative.[20]

C. The Traders' Equations

Substituting these defined relations into the original export-import equations (5 and 6), spot demand and supply equal:

$$D(t) = M_t(1/x_t) + \mu(z_t + m_t) - \S x^*_t + [\mu(z_{t-1} + m_{t-1}) - \S x^*_{t-1}]. \tag{11}$$

$$S(t) = X_t - \mu'(z_t + m_t) + \S' x^*_t - [\mu'(z_{t-1} + m_{t-1}) - \S' x_{t-1}] - \mu(z_{t-1} + m_{t-1}). \tag{12}$$

Equilibrium in this spot-exchange market is achieved when $D(t) = S(t)$; that is, when $D(t) - S(t) = 0$. Utilizing arbitrary notations as positive coefficients, the newly-specified exporter-importer equilibrium becomes:

$$[M_t(1/x_t) - X_t] + b(z_t - m_t) - cx^*_t + d(z_{t-1} - m_{t-1}) + ex^*_{t-1} = 0. \tag{13}$$

Each of the coefficients represents the net quantity of exchange demanded or supplied at given values of its determinants (x^*, z, m). Given an inequality between export and import values in one period, exchange-price changes in the next period lead either to private capital flows to absorb the deficit or surplus, or official stabilization purchases or sales.[21]

[20] Hypothesizing $\beta > (\eta + \partial)$, § is negative.

[21] Letting x_0 equal the export-import equilibrium spot exchange rate, assume $x_{t-1} > x_0$ and thus $[M_{t-1}(1/x_{t-1})] \neq X_{t-1}$. At the higher exchange rate, the exchange value for the same quantity of imports is less, leaving an excess supply of foreign exchange equaling $X_{t-1} - [M_{t-1}(1/x_{t-1})]$. This will be absorbed via capital outflows within the stabilization limits. If the

III. The Mathematics of Speculation and Interest-Rate Arbitrage

In addition to traders of goods and services, nontrading firms also engage in interest arbitrage and speculation. Commercial banks, for instance, have inventories of foreign exchange as the intermediary in the financing of trade. The relative degree of response between arbitrage and pure speculation will parallel that of the trading firms, though the absolute amount of arbitrage and speculative volume is probably larger.[22]

Looking again at the spot market, the demand for foreign exchange for interest-arbitrage purposes (D_i) is a function of the covered-interest-rate differential ($z+m$). But, again, if the expected spot-price change is sufficient and deemed lasting (for at least the term of the forward contract), *uncovered* arbitrage (D'_i) takes place. If arbitrageurs believe that the spot price of foreign exchange will either remain stable or rise, their expected return will be related to the predicted spot price, adjusted for the interest differential. There will be spot speculators also who neither export nor import. This speculation (D_s) is a positive function of the expected spot-price change (x^*), adjusted for opportunity cost.[23] Here, opportunity cost is significant because the choices are among: making a riskless investment, taking some risk, and doing nothing. Finally, the supply of foreign exchange spot is augmented by those who bought exchange forward during the preceding period. This "excess supply" (S_i) comes from earlier covered-interest-rate arbitrageurs.

Arbitrage-speculative activity from both nations can be combined to express the *net* demand and supply of exchange for these purposes. This yields the following equations for nontrading firms:

Net pure speculation (nontraders)

$$D_s(t)=\rho(x^*_t-u_t). \tag{14}$$

Net uncovered interest-arbitrage (nontraders)

$$D'_i(t)=\varepsilon(x^*_t+m_t). \tag{15}$$

Net covered interest-arbitrage (nontraders)

$$D_i(t)=\alpha(z_t+m_t). \tag{16}$$

Net supply, prior arbitrage (nontraders)

$$S_i(t)=\alpha(z_{t-1}+m_{t-1}). \tag{17}$$

It is hypothesized that $\rho > \alpha > \varepsilon > 0$. In words, the relative magnitudes of these coefficients correspond to the ancillary nonhedging transactions' coefficients of the exporters-importers.[24] Comparing these coefficients with those of the importers-exporters group, it seems reasonable to hypothesize that $\beta > \rho > \eta > \alpha > \mu > \varepsilon > \partial$. But it is further hypothesized that the volume of pure speculation and uncovered arbitrage by exporters-importers plus nontraders will exceed any hedging volume from traders; hence, $(\eta+\partial+\rho+\varepsilon)>\beta$. By summing export-import activity with nontraders'

spot rate (x_{t-1}) *is* the upper limit, there will be an official capital outflow as the home central bank draws down official foreign reserve assets to peg the rate. Thus, at the upper or lower limit, excess supplies and demands are absorbed in part by the central banks.

[22] In reality, this is an unsettled empirical question. The answer does not alter the aggregative solution to this model, however.

[23] Again, the U. S. Treasury-bill rate is the proxy variable for opportunity cost.

[24] The nontrader's interest-rate-arbitrage function will result in either a net inflow or outflow of funds, depending mainly on whether the differentials favor the home economy or the foreign.

arbitrage-speculative actions, the new equilibrium condition becomes:

$$D(t)+D_i(t)+D'_i(t)+D_s(t)-S(t)+S_i(t)=0. \tag{18}$$

This expresses the *net* relationships between exports and imports, as well as between inward and outward arbitrage and speculation.

Substituting the values of all these functions:

$$\begin{aligned} &M_t(1/x_t)+\mu(z_t+m_t)-\S x^*_t+ \\ &\quad[\mu(z_{t-1}+m_{t-1})-\S x^*_{t-1}] \\ &+\alpha(z_t+m_t)+\varepsilon(x^*_t+m_t)+\rho(x^*_t-u_t)= \\ &\quad X_t-\mu'(z_t+m_t)+\S' x^*_t- \\ &\quad[\mu'(z_{t-1}+m_{t-1})-\S x^*_{t-1}] \\ &\quad-\mu(z_{t-1}+m_{t-1})+\alpha(z_{t-1}+m_{t-1}). \end{aligned} \tag{19}$$

Again, using arbitrary notations, the simplified equation is:

$$\begin{aligned} &[M_t(1/x_t)-X_t]+b'(z_t+m_t) \\ &\quad+c'x^*_t+d'(z_{t-1}+e'x^*_{t-1}=0, \end{aligned}$$

where $c' > b'$ and $e' > d'$. (20)

This equation is *identical in form* to the importer-exporter equilibrium solution (13).[25] The only substantive difference is the sign of the expected-price variable (x^*).[26]

IV. *The Forward Market*

Demand for forward foreign exchange equals the exchange value of imports hedged (from the point of view of the home nation) plus the quantity of dollars sold (in foreign exchange terms) to cover interest-arbitrage operations by foreigners. Assuming no forward speculation, this yields the demand for forward contracts in period t:

$$D'(t)=\beta x^*_t-\mu'(z_t+m_t). \tag{21}$$

The supply of forward foreign exchange is the foreign-exchange volume of exports (from the view of the home economy) hedged for the future delivery date plus the quantity of foreign exchange sold forward as cover for interest-arbitrage transactions.[27] Hence, the supply of forward contracts in period t is:

$$S'(t)=\mu(z_t+m_t)+\beta' x^*_t+\alpha(z_t+m_t). \tag{22}$$

In equilibrium,

$$\begin{aligned} &\beta x^*_t-\mu'(z_t+m_t)-[\mu(z_t+m_t)+ \\ &\quad\beta' x^*_t+\alpha(z_t+m_t)]=0. \end{aligned} \tag{23}$$

Although the spot rate results from the interaction of the spot and forward markets, forward prices are determined in the forward market. In solving the above equilibrium equation,[28] the forward price is found to be:

$$y(t)=x_t-\hat{m}_t\pm\tau'\hat{x}^*_t. \tag{24}$$

[25] Assuming covered arbitrage in the preceding period by both nontraders and importers-exporters, maturing contracts of period t−1 would be *adding to* the current excess supply of foreign exchange.

[26] The actual level and relative sizes of these coefficients is an empirical question. In any case, the statistical findings of Stein are consistent with the outcomes in the solutions to the equations of this model.

[27] Covered arbitrage tends to transfer, in effect, excess supply in the spot market to the forward market.

[28] The caret ($\wedge$) indicates that values formerly expressed in percentages (see definition of z in the table) are now in absolute terms. This results in equation (24) by dividing all terms by 365 and multiplying them by x. Dividing by 365, the extra percent return annually from investing in foreign Treasury bills, (m), becomes the extra percent return at a daily rate, say m′. Multiplying by the current exchange rate, (x), we have the current unitary exchange value of extra return per day, that is, (m′x). Strictly, we then multiply through by j, yielding the current unitary exchange value of extra return for the period of the contracts, that is, $\hat{m}=j(m'x)$, and leaving $j/i(\hat{x}^*)$. Now the coefficient of both y and x is one.

The actual sign of the speculative variable is indeterminant at this point, and depends upon which nation's importers are hedging the most.

Thus far, currency speculation has been confined to the spot market. The real world is contrary to this. Indeed, outward speculation usually exerts an upward pressure on exchange rates of various maturities, and is in fact more common in the forward than in the spot market. A forward contract in the foreign currency may be purchased by speculators who expect the future spot rate to exceed the current forward rate. Upon delivery of the "futures" contract at the maturity date, it is sold for a profit. Hence, the forward equation (24) is amended, with its own speculative function:

$$y(t)=x_t-\hat{m}_t+(\S'\pm\tau')\hat{x}^*_t. \tag{25}$$

Assuming that $\S'>\tau'$, the net-forward-speculative function definitely is positive from the home nation's view:[29]

$$y(t)=x_t-\hat{m}_t+\tau'\hat{x}^*_t. \tag{26}$$

When there is pure speculation, the forward and the spot rates usually will move in the same direction, and speculation will not be a factor tending to make the forward premium less. If devaluation is expected, speculators attack the home currency and begin purchasing forward contracts, and the forward price will move to a considerable premium if the spot rate is already at its upper limit.

V. *Spot and Forward Simultaneous Equilibriums*

A. Price Determination

The market spot-exchange rate can be determined by solving simultaneously the spot and forward equations (19 and 23). Solving these equations for the spot rate (x):

$$x(t)=M_t\{X_t+\alpha'(z_{t-1}+m_{t-1}) \pm\tau x^*_{t-1}-[\varepsilon v_t-(\varepsilon+\rho)u_t]-\lambda x^*_t\}^{-1}$$

where $\lambda>(\varepsilon+\rho)>\alpha'$. (27)

Assuming that $X_{t-1}=M_{t-1}(1/x_{t-1})$, all lagged variables can be dropped. This yields the simplified solution:

$$x(t)=M_t\{X_t-[\varepsilon v_t-(\varepsilon+\rho)u_t]-\lambda x^*_t\}^{-1}. \tag{28}$$

Now the complete solution for the forward rate is obtainable. Substituting the right-hand side of the above equation for x(t) in equation (24),

$$y(t)=M_t\{X_t+\alpha'(z_{t-1}+m_{t-1}) -\tau x^*_{t-1}-[\varepsilon v_t-(\varepsilon+\rho)u_t]-\lambda x^*_t\}^{-1}-\hat{m}_t +\tau'\hat{x}^*_t. \tag{29}$$

Simplified, as above,

$$-y(t)=M_t\{X_t-[\varepsilon v_t-(\varepsilon+\rho)u_t]-\lambda x^*_t\}^{-1} -\hat{m}_t+\tau'\hat{x}^*_t. \tag{30}$$

As the forward premium (or discount when negative) equals the forward exchange rate minus the spot exchange rate,

$$\hat{z}(t)=y(t)-x(t). \tag{31}$$

Substituting the solutions for the spot and forward rates (equations 27 and 29),

$$\hat{z}(t)=-\hat{m}_t+\tau'\hat{x}^*_t. \tag{32}$$

The similarity in form of the spot-rate solution (28) to the simple export-import definition of the exchange rate (4) is noteworthy. It is noted also that this is an equilibrium solution. In the real world, persistent excess demand and supply spot is absorbed by the central banks at the upper-lower limits, wherein the spot rate becomes a constant. But the result of

[29] In the case of prior forward speculation, the supply of foreign exchange in the spot market would be augmented by, say $(\S'-\tau')x^*_{t-1}$. For simplicity, the same speculative coefficient used in equation 24 is repeated in equation 26.

moving from a position of disequilibrium is only slightly different.[30]

B. Price Behavior

In verbal terms, the spot equation says that the spot foreign-exchange rate is dependent upon the relationships among the absolute levels of exports versus imports, the expected spot-price change, and the interest differential. An increase in imports, *ceteris paribus*, increases the foreign exchange rate by shifting the demand for foreign exchange rightward. A one percent advance in the domestic bill rate tends to reduce the spot price by more than the augmentation of the spot price resulting from a one percent increase in the foreign bill rate. Rising expectations regarding future spot rates exert a greater upward valuation on spot exchange than do changes in either interest rates.

A rise in expectations regarding the future spot price will tend to add more to the forward exchange rate than to the spot, the differential being a multiple of τ'. Thus, the forward premium will widen, tending also to make covered arbitrage more attractive.[31]

With the exception of the notation for expected price changes, the simplified solution for the forward premium (equation 32) is the same as the concept of interest-rate parity, in which the forward premium (or discount) equals the negative interest differential, that is, $z=-m$. But in a dynamic model, a higher expected spot price yields a greater forward premium or lesser forward discount. This is because the Keynesian notion excludes hedging, uncovered interest-rate arbitrage and pure speculation. Only under the most static circumstances would interest parity always hold.

Although a rise in the expected future spot price tends to exert upward pressures on the spot and forward prices, in a normal period this movement will continue only until the spot price has been pushed nearly to its upper support level (see footnote 21). The turning point will occur when the expected price becomes equal to the current rate. At that time, the leads and lags will be reversed and, *ceteris paribus*, the old market price reestablished.

C. Interest-Rate Parity Revisited

The domestic Treasury-bill rate necessary for equilibrium, in terms of interest-rate parity, is one equal to the foreign Treasury-bill rate plus a forward discount which equals the interest-rate spread:

$$u(t)=v(t)-z(t). \tag{33}$$

The modern dynamic model gives a quite different requirement. Solving the spot and forward equations simultaneously for the U. S. Treasury-bill rate (from the simplified equation),

$$u(t)=\{M_t(1/x_t)-X_t]+ \varepsilon v_t+\lambda x^*{}_t\}(\varepsilon+\rho)^{-1}, \tag{34}$$

where $\lambda > \varepsilon$.

Contrary to the Keynesian concept that the domestic interest rate necessarily equals the foreign interest rate and the cost of covering, in this dynamic model the domestic interest rate must equal some base value plus a fraction of the foreign interest rate *plus* some positive function of the expected spot-price

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[30] This is demonstrated in Canterbery, *op. cit.*, pp. 48-55.

It also is noted that this solution is similar to the equation tested by Stein in which he finds the speculative variable to be highly significant. See Stein, "International Short-term Capital Movements," *op. cit.*, p. 65.

[31] Such transactions spot are "cushioned" by the relatively large volume of import-export transactions (see equation 27). But in the more volatile forward market the relation is more direct. Speculation forward has both a greater and more immediate effect upon the *forward* exchange rate.

change.[32] (This assumes no prior arbitrage or speculation.) The domestic Treasury-bill rate must be extremely high to curb capital flights during a period of speculation (rising expected price) against the domestic currency. (In reality, the speculators must be persuaded that the domestic government now prefers depression to devaluation.) Once this more difficult policy objective is met, capital flows will cease only if movements in other variables do not favor further outflows.

VI. The Central Bank Dilemma

The behavior of the covered interest-rate variable (r) is of special interest. With the thinner forward market, forward covered-arbitrage sales (which are equal to covered spot interest-rate-arbitrage purchases) will cause a greater decline in the forward rate than a rise in the spot, according to the model. This relative price movement is propitious because the process of covered interest arbitrage transmits all excess supply from the spot to the forward market during a normal period. The normal leading and lagging of importers-exporters is usually self-equilibrating, in the absence of other forces. Uncovered arbitrage, which is in part speculative, would advance the spot, while not directly affecting the forward rate.

Only covered interest-rate arbitrage has the dual advantage of lowering the forward rate considerably more than raising the spot price. (The relationship between the interest differential and the forward rate is unitary, while the similar correspondence in the spot market is very much less than unitary.) But suppose the domestic central bank exerts an upward pressure on the domestic Treasury-bill yield for the ostensible purpose of slowing the outflow of arbitrage capital. All else is held constant. In the dynamic model, the consequent rise in the forward premium will equal the decline in the interest-rate differential, leaving the new covered interest-rate differential unchanged.[33] If there is outward speculation, capital outflows may continue unabated, if not accelerated. Viewing these events from the standpoint of the forward premium, it is clear that, in the model, a higher domestic bill rate alone soon leads to no less incentive to conduct interest-rate arbitrage.

The domestic central bank is in a dilemma. Speculation, including uncovered arbitrage, is not very responsive to interest-rate changes. Conditions for both pure speculation and uncovered interest-arbitrage are extremely favorable under the current system of a narrow gold band. In order to detract speculators, the interest rate must be increased greatly and rapidly, perhaps pushing it to a height inconsistent with domestic economic expansion. And even then it might elicit the opposite of the desired response. On the other hand, even a meager advance in the interest rate will add to the forward premium, reducing the cost of cover, possibly encouraging further covered interest arbitrage in the disequilibrium case, and thus merely reinforcing the necessity for raising the domestic interest rate.

VII. Conclusions

Even though this model is more complex than its predecessors, its solution *sans* lagged variables is similar. Its parts cast some doubt upon the wisdom of using short-term interest-rate increases to slow capital outflows, as well as the efficacy of maintaining such a narrow "gold band."

[32] The speculative coefficient is $\lambda/(\varepsilon+\rho)$. Since $(\rho+\varepsilon)<\lambda$, this value exceeds one, whereas the foreign interest-rate coefficient $(\varepsilon/\varepsilon+\rho)$ is clearly less than unitary.

[33] This is illustrated by substitution in the equation determining the forward premium (32).

Relatively-fixed spot exchange rates under the gold-exchange system do not lead always to stable exchange markets. Forces in the modern market can lead to the necessity of prolonged support measures at the lower limit of certain currencies, resulting in gold and foreign exchange losses. While fixed, or relatively-fixed spot exchange rates, do not affect changes in the absolute levels of exports and imports, fluctuations within these limits are sufficient to incite destabilizing short-term capital flows. Indeed, uncovered arbitrage and pure speculation—held constant in the Keynes-type model—can result in movements away from interest parity. Barring these forces, a shortage of arbitrage funds alone can preclude interest-rate parity.

A domestic Treasury-bill rate equal to the foreign-bill yield plus the forward premium traditionally has yielded this parity. During an "abnormal" or "speculative-abnormal" period, however, only forward arbitrage sales (in the new model) contribute to a greater decline in the forward rate than a rise in the spot. As the speculative function dominates such a period, it is futile for the monetary authorities to attempt to slow "hot money flows" with higher interest rates. This interest-rate policy fails not only to discourage speculation, but also ultimately fails to lessen the incentive for conducting covered interest-rate arbitrage.

► STUART I. GREENBAUM

A Study of Bank Costs

Despite the anomalous structure of the commercial banking industry, there appears to be wide agreement on one criterion for its optimal organization. Other things equal, the preferred structure will produce the desired volume and mix of output at lowest cost. The purpose of this study is to illuminate the facts with respect to bank costs. Cost-function parameters are estimated in order to evaluate returns to scale in banking.[1] Both firm size and structure—branch versus unit—are treated as cost-function arguments permitting generalizations with respect to two modes of firm growth.

We begin with the problem of measuring bank output. Dissatisfaction with the earlier definitions of bank output has prompted the development of a new measure. After a brief discussion of the measurement of bank costs, we deal with the cost-output relationship. Cost functions are fitted separately for a cross-section of member banks in the Tenth (Kansas City) and Fifth (Richmond) Federal Reserve Districts. The estimated parameters of these cost functions suggest generalizations regarding the effects of variation in output and structure on the costs of bank operations. A concluding section discusses the findings most pertinent to issues of public policy.

I. Bank Output

The measurement of bank output is

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[1] Structural cost-function parameters are estimated directly, and the possibility of simultaneous equations bias is not explicitly taken into account.

complicated both because banks are multi-product firms and because their output consists of services. Most students of bank costs have employed highly aggregative balance-sheet variables—assets, earning assets, deposits—to measure bank output.[2] This study accords explicit recognition to the multi-product nature of bank output.

Bank output is initially divided into two types: lending output and all other output. Financial intermediation, as reflected in lending output, is viewed as the primary function of commercial banks. Banks purchase the use of funds or sell their liabilities, and then sell the use of funds or purchase the liabilities of others. This view suggests the use of deposits, or more generally, the right-hand side of the bank's balance sheet as a measure of input use. Correspondingly, it suggests the use of earning assets as a measure of bank output. However, the multi-product nature of lending output requires an appropriate disaggregation of earning assets.

A. Lending Output

The appropriate level of disaggregation was determined by experimenting with least-squares regression equations of the following general form:

$$\frac{Y_i}{A_i} = b_o + \sum_{j=1}^{n} b_j \frac{Z_{ij}}{A_i} + \sum_{j=n+1}^{m} b_j X_{ij} + U_i, \quad (1)$$

where $b_o, b_1, \ldots, b_m$ are calculated net-regression coefficients; Y_i is the ith bank's gross operating income directly attributable to lending; A_i is the ith bank's total assets—a size deflator;[3] Z_{ij} is the ith bank's holding of the jth type of earning asset; X_j are variables designed to isolate systematic inter-firm price variation attributable to imperfect markets; and U_i is a stochastic term.[4]

All of the data, except those relating to the X_j variables, came from individual bank Reports of Condition and Reports of Income and Dividends for 1961. The banks included all member banks in the Tenth and Fifth Federal Reserve Districts, except those recently formed.[5] Much of the experimentation consisted of redefining the Z_j variables to maximize disaggregation of earning assets, subject to two constraints. One constraint is imposed by the form of the Report of Condition. The second derives from the interpretation of the regression coefficients as gross yields or rates of return. An asset classification was rejected if any of the regression coefficients were negative, c_i not significantly different from

[2] David A. Alhadeff, *Monopoly and Competition in Banking*, Berkeley, Calif.: University of California Press, 1954; Paul M. Horvitz, "Economies of Scale in Banking," *Private Financial Institutions*, research study prepared for Commission on Money and Credit, Englewood, N. J.: Prentice-Hall, 1963; Irving Schweiger and John S. McGee, *Chicago Banking: The Structure and Performance of Banks and Related Financial Institutions in Chicago and Other Areas*, Chicago: Graduate School of Business, University of Chicago, 1961; Lyle E. Gramley, *A Study of Scale Economies in Banking*, Kansas City: Federal Reserve Bank of Kansas City, 1962.

[3] Income and earning-asset variables were deflated to mitigate heteroskedasticity.

[4] Regression coefficients will be best linear unbiased estimators if U_i has an expected value of zero and constant variance for all i, and U_i is independent of Z_{ij}/A_i and X_{ij} for all i,j. The problem of error variance was commented upon in the previous footnote. The assumption regarding independence among residuals, and between residuals and independent variables, can be violated as a result of imperfect output markets. It was concern for this problem that led to the introduction of the X_j variables.

[5] The 745 banks in the Tenth District and the 413 banks in the Fifth District were treated as separate samples, resulting in individual regression equations for each District.

zero.[6] Moreover, if the regression coefficients were not readily reconcilable with *a priori* knowledge regarding levels and relationships among interest rates, the asset classification was questioned.

Table 1 describes the selected earning-asset classification and the associated regression estimates.[7] The same 16-category classification is used in the two samples, permitting inter-District gross-yield comparisons. The preferred measure of lending output in each District is:

$$L_i = \sum_{j=1}^{16} b_j Z_{ij} , \qquad (2)$$

and to accord recognition to the presence of an unanticipated regression intercept, a second measure of lending output is defined:

$$L_i^* = \sum_{j=1}^{16} b_j Z_{ij} + b_o A_i . \qquad (3)$$

Equations 2 and 3 were obtained by estimating equation 1 (see Table 1). The regression intercept is alternately deleted and included in equations 2 and 3, but it was not fixed at zero in estimating equation 1.

B. Non-lending Output

Efforts to find plausible measures of non-lending output were largely unsuccessful. The income measure, Y_i, was redefined to include all operating income, and variables such as time and demand deposits, debits, and number of trust accounts were included among the arguments of the regression equation.[8] It was thought that these variables might be used to measure transactions or clearing output and the output of trust departments. However, implausible coefficients were obtained. These failures led to the use of the difference between total operating income and income directly attributable to lending as the measure of non-lending output. This residual measure differs from the lending-output measure in its sensitivity to inter-firm price differences. As a result, the non-lending output measure will impart a bias of unknown magnitude to the output measure. Firms charging relatively high prices for non-lending services will have inflated output. However, non-lending income typically accounts for only 10 percent of operating income.

C. Problems and Interpretation

Output of the ith bank is defined in two ways:

$$Q_i = L_i + S_i , \qquad (4)$$

$$Q_i^* = L_i^* + S_i , \qquad (5)$$

where L_i and L_i^* are alternative measures of lending output and S_i is non-lending output. Both Q_i and Q_i^* are adjusted gross-income measures. The lending component of output is a linear function of the dollar amounts of each type of earning asset held in the bank's portfolio. If the community's demand for bank credit is expressed in terms of the size distribution of loans, as well as in terms of aggregate dollar amounts, the output definition employed here is apt to overstate economies of scale.[9]

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[6] The 4.55 percent level of significance is used throughout the study.

[7] A detailed description of the experimentation underlying the selection of the asset classification can be obtained by writing the author.

[8] Operating income minus Y_i was also regressed on variables related to various types of non-lending output.

[9] The argument that lending output is appropriately defined not only in terms of aggregate dollar amounts, but also in terms of mean loan size—and perhaps other moments of the loan-size distribution, as well—derives from the idea that a $1,000 loan is not a perfect substitute in consumption for 20 loans of $50, and that the latter represents greater output.

In two recent bank cost studies, output was measured as number of transactions, standardized in terms of dollar amounts. See George J. Benston, "Economies of Scale and Marginal Costs in Banking Operations," *The National Banking Review*, 2, June 1965, pp. 507-549;

TABLE 1

Regression of Lending Income on Earning Asset and Banking Structure Variables for Tenth and Fifth Districts [1]

Earning asset variables	Independent variables	Regression coefficient[2] by district: Tenth	Fifth
Z_1	Nonguaranteed loans to farmers	.0579 (24.965)	.0401 (5.684)
Z_2	Automobile loans to individuals	.1081 (20.905)	.0821 (14.270)
Z_3	Loans to purchase other retail consumer goods on installment basis; Installment loans for household, family, and other personal expenditures	.0927 (10.794)	.0819 (11.992)
Z_4	Installment loans to repair and modernize residential property	.1008 (5.189)	.1180 (5.716)
Z_5	Government-guaranteed residential real-estate loans	.0467 (5.648)	.0389 (5.429)
Z_6	Conventional real-estate loans	.0584 (7.697)	.0590 (15.559)
Z_7	Real-estate loans secured by farm land	.0548 (5.979)	.0553 (5.889)
Z_8	Real-estate loans secured by nonfarm, nonresidential property	.0460 (4.287)	.0385 (4.408)
Z_9	Corporate stock (including FRB); Loans, bonds, notes, and debentures not otherwise classified	.0248 (4.905)	.0233 (4.902)
Z_{10}	Treasury notes and U. S. bonds maturing within 1 year	.0315 (7.889)	.0278 (5.324)
Z_{11}	Treasury notes and U. S. bonds maturing 1- to 5-years; U. S. nonmarketable bonds	.0365 (14.576)	.0269 (6.796)
Z_{12}	U. S. bonds maturing after 5 years but within 10 years; U. S. bonds maturing after 10 years; Securities guaranteed by U. S. Government	.0336 (10.009)	.0289 (5.954)
Z_{13}	Obligations of states and political subdivisions	.0285 (9.705)	.0311 (6.539)
Z_{14}	Commercial and industrial loans; Loans to nonbank financial institutions	.0535 (14.639)	.0474 (10.696)
Z_{15}	Single-payment loans for household, family, and other personal expenditures; Loans for purchasing or carrying stocks, bonds, and other securities	.0519 (7.723)	.0443 (8.684)
Z_{16}	Loans to domestic commercial and foreign banks; Loans to brokers and dealers in securities; Treasury bills; Treasury certificates of indebtedness; Loans to farmers directly guaranteed by CCC	.0233 (8.961)	.0199 (4.656)
Banking structure variables			
X_1	Population of domicile area[3]	$-.0461(10^{-2})$ (5.194)	$-.0160(10^{-2})$ (1.564)
X_2	State[4]	$-.0120(10^{-1})$ (8.758)	$-.0220(10^{-1})$ (4.413)
X_3	Number-of-banks located in domicile area[5]	$-.0918(10^{-2})$ (2.880)	$-.0123(10^{-2})$ (0.283)

TABLE 1 (Cont'd)

Other statistics	District	
	Tenth	Fifth
Adjusted coefficient of multiple determination	.6946	.6614
Standard error of estimate	.0034	.0033
Degrees of freedom	725	393
Regression intercept	.0049	.0042
	(41.00)	(26.25)

[1] Income and assets data are from the Report on Income and Dividends for year ending December 31, 1961, and the Report of Condition, December 30, 1961, respectively. Lending income includes: (a) interest and dividends on obligations of the U. S. Government, states and political subdivisions, other bonds, notes and debentures, and corporate stocks including stock of the Federal Reserve banks; (b) interest and discounts on loans; (c) service charges and other fees on loans. Income and earning-asset variables are divided by total assets.

[2] Numbers in parentheses beneath regression coefficients are absolute values of calculated t statistics.

[3] Population data are based on the 1950 census. The variable takes on rank values according to the population class into which the domicile area of the bank falls.

Rank	Population	Rank	Population
01	Under 250	09	25,000-49,999
02	250-499	10	50,000-99,999
03	500-999	11	100,000-249,999
04	1,000-2,499	12	250,000-499,999
05	2,500-4,999	13	500,000-999,999
06	5,000-9,999	14	1,000,000-2,499,999
07	10,000-14,999	15	2,500,000-and over
08	15,000-24,999		

[4] The states of each District and the District of Columbia were ranked as high or low interest-rate areas on the basis of estimated rates charged on consumer loans, the seemingly most homogeneous earning-asset category. The Tenth District ranking is: (1) Oklahoma; (2) Colorado, New Mexico, Wyoming; (3) Kansas, Missouri; (4) Nebraska. The Fifth District ranking is: (0) North Carolina, South Carolina, Virginia, West Virginia; (1) Maryland, District of Columbia.

[5] The "number of banks" variable is trichotomously defined: (1) all banks in one-bank towns; (2) all banks in two-bank towns; (3) all other banks.

Interpretation of Q and Q° may be facilitated by relating them to output measures used in earlier bank cost studies. Earning assets and total assets may be thought of as indexes combining diverse balance sheet categories with implicit weights equal to one. Q and Q°—more accurately, L or L°—differ from these other measures primarily because the weights are estimated market prices for the various classes of output.[10] Unit-weighting implies output homogeneity whereas the weighting system underlying Q and Q° recognizes product differences in terms of marginal rates of substitution in consumption.

Frederick W. Bell and Neil B. Murphy, "Returns to Scale In Commercial Banking," *Studies In Quantitative Analysis of Bank Behavior*, Working Paper 1, March 1967, Federal Reserve Bank of Boston.

[10] Note also that earning assets and total assets are stocks, whereas Q and Q° are flows.

The problem of selecting output weights may be postponed while still recognizing the multi-product nature of bank output. For example, consider equation 2. Instead of expressing cost as a function of L, cost may be related directly to $\sum_{j=1}^{16} Z_j$. The key disadvantage of the multi-valued output measure arises when generalized inter-firm comparisons are desired. In this case, the problem of weighting cannot be avoided.

The importance of explicit weighting is suggested by the wide differences among earning-asset regression coefficients. Table 2 describes the variation among earning-asset portfolios in the Tenth and Fifth Districts, where earning-asset classes are expressed as ratios to total assets. The coefficients of variation range from 0.546 to 2.347 in the Tenth District, and from 0.491 to 1.500 in the Fifth District. The standard deviations

TABLE 2

The Arithmetic Means ($\bar{X}$), Standard Deviations (S), and Coefficients of Variation ($S/\bar{X}$) for the Asset Classification

	Tenth district			Fifth district		
	$\bar{X}$	S	$S/\bar{X}$	$\bar{X}$	S	$S/\bar{X}$
Z_1	.1623	.1275	.786	.0254	.0326	1.283
Z_2	.0351	.0320	.912	.0462	.0366	.792
Z_3	.0179	.0189	1.056	.0417	.0310	.743
Z_4	.0038	.0077	2.026	.0058	.0087	1.500
Z_5	.0072	.0169	2.347	.0175	.0249	1.423
Z_6	.0243	.0226	.930	.1018	.0662	.650
Z_7	.0145	.0163	1.124	.0212	.0230	1.085
Z_8	.0128	.0156	1.219	.0287	.0209	.728
Z_9	.0142	.0276	1.944	.0331	.0447	1.350
Z_{10}	.0367	.0373	1.016	.0390	.0391	1.003
Z_{11}	.1488	.0813	.546	.1436	.0705	.491
Z_{12}	.0399	.0475	1.190	.0475	.0461	.971
Z_{13}	.0829	.0589	.710	.0606	.0452	.746
Z_{14}	.0693	.0599	.864	.0848	.0670	.790
Z_{15}	.0207	.0218	1.053	.0521	.0434	.833
Z_{16}	.0930	.0830	.892	.0600	.0573	.955
$\sum_{j=1}^{16} Z_j$	.7834			.8090		
Z_{17}	142464.	457885.	3.214	195733.	578392.	2.955

Note: Z_{17} is total assets in hundreds of dollars. See Table 1 for description of other variables. All variables except Z_{17} are divided by total assets.

exceed corresponding means in 9 of 16 cases in the Tenth District, and in 6 of 16 cases in the Fifth District.[11]

The regression coefficients are subject to the influence of a number of potential sources of bias. For example, the banking-structure variables (ΣX_j in equation 1) in the output-regression equation were introduced to isolate the effects of imperfect markets, and thereby expunge monopoly elements from the rate-of-return estimates. It is probably unreasonable to expect the earning-asset coefficients to have been completely purified. To the extent that some coefficients contain greater monopoly elements than others, banks with relatively large amounts of the corresponding earning assets will have overstated output.[12]

The use of year-end, earning-assets data represents another potential source of bias. The year-end values may be thought of as estimates of the average of all instantaneous rates of output throughout the year. The estimates may be biased as a result of differences in patterns of seasonal variation among earning-asset categories and the alleged practice of "window-dressing" year-end balance sheets.[13] Averaged-assets data

[11] The smaller average size but greater size variation among Tenth District banks reflects the prevalence of unit banking in the Tenth District. The greater heterogeneity among banks in a unit-banking milieu is reflected in higher coefficients of variation. ΣZ_j is an estimate of the average ratio of earning assets to total assets.

[12] If all the earning-asset coefficients contain some fixed monopoly mark-up, this problem does not arise since the relationship among coefficients—not their absolute levels—is of primary importance. However, there is little reason to expect a constant monopoly factor among coefficients. The markets in which various types of earning assets are traded are quite dissimilar.

[13] In experimenting with Condition Report data on total loans and investments, 1953-1961, for large groupings of member banks, the last quarter seasonal-adjustment factor always ex-

were tested. Each earning-asset variable was measured as the arithmetic mean of reported holdings on the four reporting (call) dates in 1961. The averaged earning-asset data generally resulted in lower coefficients of determination and lower t statistics and, therefore, were rejected.

Differences in the average acquisition dates among classes of earning assets may introduce another type of bias. If the secular rate of increase in yields is the same for all classes of earning assets, there will be a tendency to underestimate current rates of return on those assets with the greatest portfolio age. If the interest-rate trend varies among asset classes, estimates may be biased even in the absence of differential portfolio age.

Still another type of bias may result because differences between asset purchase and sale prices are treated as capital gains or losses and are excluded from current operating revenue. The tax law adds a further complication by treating net capital losses as offsets to income while net capital gains are taxed at a preferential rate. This creates an incentive to bunch gains and losses in separate years and to trade-off interest income for capital gains.

This incomplete discussion of sources of bias should convey the complexity of the problem. Orders of magnitude are unknown and even the direction of bias is difficult to ascertain in some cases. However, the regression estimates are generally plausible, suggesting that the problem may not be as severe as a listing of sources of bias might suggest.

II. Bank Costs

The measure of bank costs—current operating expenses—comes from the annual Report of Income and Dividends submitted to the Federal Reserve System by all member banks. The major components of current operating expenses are labor cost, interest cost of deposits and other borrowed funds, and occupancy and equipment expense.[14] The cost measure excludes all income taxes, accounting profits, and recorded capital gains. Recorded capital gains include elements of operating income, capital gains in the economic sense, and fictitious asset revaluations. As such, they are exceedingly difficult to interpret.[15]

The fact that the cost measure is sensitive to factor-price differences merits emphasis. Considerable attention was given to the possibility of inter-firm price differences in the output markets. It would appear equally plausible, *a priori*, that inter-firm price differences exist in the input markets as well. However, the use of current operating expense assumes that firms within each District face the same perfectly elastic supply curves for all factors of production. If the input markets are substantially imperfect, this assumption is likely to bias the returns-to-scale findings. Several writers have noted that wages and salaries for nominally similar jobs are generally higher

ceeded 100.0, but was never as great as 102.0. See "Banking Structure and Reactions to Monetary Stringency or Ease," *Monthly Review*, Federal Reserve Bank of Kansas City, March-April 1963, pp. 9-15.

[14] Typically, labor costs are about 45 to 50 percent of current operating expense, interest costs are 20 to 25 percent and occupancy and equipment expenses are about 10 percent.

[15] The two major components of recorded capital gains are loan revaluations and differences between the purchase and sale or redemption price of securities. Commercial banks may record losses on loans as they are realized, or they may accumulate bad debt reserves in legally-specified amounts. At the time this research was done, the bad debt reserve limit was determined by multiplying the currently-held amount of loans by three times the average annual loss rate for any consecutive 20-year period since 1927. Since the loss ratios of the depression years were atypically high, banks generally found it advantageous to accumulate bad debt reserves. Gains and losses on securities are calculated as the difference between purchase and sale or redemption price and are recorded when realized.

at large banks than at small banks.[16] This criticism overlooks the possibility that banks of different size are not apt to be purchasing standard units of labor inputs despite the similarity of job descriptions. Systematic differences among banks in rates paid on time deposits would appear to be stronger evidence of imperfect factor markets and more telling criticism of the use of current operating expense.

It has also been argued that interest expense does not represent a social cost and, therefore, should not be treated as a cost in estimating returns to scale in banking.[17] In evaluating this argument, it may be important to distinguish between cost and production functions. If the private-social cost disparity among inputs merely gives rise to a "wrong" set of input prices, the private-cost analysis may not be misleading for the purpose of intra-industry comparisons. The usefulness of private-cost analysis will hinge on whether the returns-to-scale parameters of the underlying production function are sensitive to changes in factor prices. The assumption of insensitivity is not *prima facie* implausible and many, if not most, production-function models used in empirical research employ the assumption.[18] Thus, the private-social cost disparities may give rise to shifting cost curves in the context of invariant slopes. It remains possible, of course, that externalities in banking result in altering production functions, in which case there would be no reason to expect private-cost analyses to produce useful results. However, arguments to this effect have not been elucidated to this writer's knowledge.

III. The Cost-Output Relationship

This section relates bank costs to the output measures, Q and Q*, as well as to earning assets, total assets and current operating earnings.[19] Additional cost-function arguments are introduced to test hypotheses regarding branch banking. Selected properties of the various output measures and the cost measure are described in Table 3. The largest Tenth District banks are approximately 1,000 times as large as the smallest, irrespective of output measure. All of the standard deviations are approximately three times their corresponding means, and striking similarity in skewness is evidenced by the mean-median ratios. The Fifth District sample is characterized by less skewness in terms of the mean-median ratio, less dispersion in terms of standard-deviation-mean ratios, and larger mean-size of bank.

The tested equations were of the following general form prior to the introduction of the branching variable:

$$\frac{C}{A} = c_o + c_1 \frac{P}{A} + \ldots + c_n \frac{P^n}{A} + V, \quad (6)$$

where C is current operating expense, P is a measure of output, A is total assets, $c_o, \ldots, c_n$ are net regression coefficients, and V is a stochastic term. Total cost (TC), average cost (AC), and marginal cost (MC) equations are derived as follows (deleting V):

$$TC = C = c_o A + c_1 P + \ldots + c_n P^n ; \quad (7)$$

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[16] Gramley, *op. cit.*, Jack M. Guttentag and Edward S. Herman, "Banking Structure and Performance," *The Bulletin*, No. 41/43, February 1967, Institute of Finance, New York University.

[17] Guttentag and Herman, *ibid.* The basic point underlying this argument is that the financial inputs in banking are controlled by the monetary authorities, and scarcity is synthetic. The same argument, it may be noted, may be made with respect to the prices of bank output.

[18] Both the Constant Elasticity of Substitution and the subsumed Cobb-Douglas models have returns-to-scale parameters that are insensitive to factor-price variation.

[19] The latter measures of output are tested to determine whether the cost-function findings are sensitive to alterations in the definition of output.

TABLE 3

Selected Properties of Variables Used in Cost Functions

(In hundreds of dollars)

	Q	Q*	COR	EA	A	C
			Tenth District			
Range						
Lower	$ 139	$ 177	$ 157	$ 3,535	$ 5,514	$ 107
Upper	172,103	176,544	155,465	3,595,018	5,286,569	91,473
Mean	5,499	6,232	5,239	105,846	142,465	3,289
Median	1,657	1,874	1,687	33,276	42,343	1,178
Standard deviation	16,105	18,410	14,581	322,691	457,886	8,413
			Fifth District			
Range						
Lower	$ 150	$ 171	$ 171	$ 3,829	$ 4,770	$ 126
Upper	207,909	232,063	220,381	4,304,960	5,797,665	142,361
Mean	7,479	8,296	7,830	152,057	195,734	5,233
Median	2,479	2,733	2,682	53,636	65,836	1,900
Standard deviation	21,392	23,788	22,081	429,597	578,393	13,967

Note: Q and Q*: see equations 4 and 5 in text.
COR: current operating revenue.
EA: total earning assets.
A: total assets.
C: current operating expense.

$$AC = \frac{TC}{P} = c_o AP^{-1} + c_1 + \ldots + c_n P^{n-1}; \quad (8)$$

$$MC = \frac{\partial TC}{\partial P} = c_1 + 2c_2P + \ldots + nc_n P^{n-1}. \quad (9)$$

Regression equations were fitted in a "build-up" fashion: costs were fitted to output; then to output and the square of output; and then to output, its square, and its cube. The cubic term was the highest-order transformation tested because the level of significance at which the null hypothesis ($c_i = 0$) could be rejected became progressively larger for higher-order terms, and for the cubic terms the level was near or beyond the pre-established critical value (4.55 percent).

The most plausible cost-output relationship for each output measure is shown in Table 4.[20] Two points are especially notable. First, the shapes of the fitted cost curves are sensitive to the measure of output used. Second, earning assets and total assets explain considerably less variation in costs than do Q, Q*, or current operating revenue (COR). The burden of proof appears to lie with those who maintain that earning assets or total assets are reasonable proxies for output. The remaining discus-

[20] When the coefficient of the cubic term is not significantly different than zero, the quadratic form is chosen as most plausible. In cases where the addition of the cubic term causes loss of lower-order variables, the quadratic form of the cost equation is selected. Regression intercepts are included if they are significantly different than zero at the 4.55 percent level.

TABLE 4

Total Cost Functions Using Alternative Measures of Output

Equation number	R^2	
		Tenth district
4.1	.512	$\frac{C}{A} = \underset{[13.1]}{-.235(10^{-2})} + \underset{[27.5]}{.771}\frac{Q}{A} - \underset{[6.13]}{.478(10^{-5})}\frac{Q^2}{A} + \underset{[3.89]}{.245(10^{-10})}\frac{Q^3}{A}$
4.2	.515	$\frac{C}{A} = \underset{[37.8]}{-.681(10^{-2})} + \underset{[27.9]}{.781}\frac{Q^*}{A} - \underset{[6.15]}{.375(10^{-5})}\frac{Q^{*2}}{A} + \underset{[3.95]}{.170(10^{-10})}\frac{Q^{*3}}{A}$
4.3	.622	$\frac{C}{A} = \underset{[14.9]}{-.238(10^{-2})} + \underset{[35.3]}{.742}\frac{COR}{A} - \underset{[3.28]}{.105(10^{-5})}\frac{COR^2}{A}$
4.4	.085	$\frac{C}{A} = \underset{[32.7]}{.818(10^{-2})} + \underset{[6.24]}{.256(10^{-1})}\frac{EA}{A} - \underset{[4.61]}{.502(10^{-8})}\frac{EA^2}{A}$
4.5	.042	$\frac{C}{A} = \underset{[94.0]}{.282(10^{-1})} - \underset{[5.80]}{.319(10^{-8})}A$
		Fifth district
4.6	.601	$\frac{C}{A} = \underset{[11.8]}{-.212(10^{-2})} + \underset{[24.7]}{.841}\frac{Q}{A} - \underset{[4.95]}{.312(10^{-5})}\frac{Q^2}{A} + \underset{[3.54]}{.131(10^{-10})}\frac{Q^3}{A}$
4.7	.601	$\frac{C}{A} = \underset{[30.9]}{-.557(10^{-2})} + \underset{[24.7]}{.840}\frac{Q^*}{A} - \underset{[5.02]}{.256(10^{-5})}\frac{Q^{*2}}{A} + \underset{[3.56]}{.968(10^{-11})}\frac{Q^{*3}}{A}$
4.8	.701	$\frac{C}{A} = \underset{[13.7]}{-.219(10^{-2})} + \underset{[31.0]}{.775}\frac{COR}{A} - \underset{[3.31]}{.162(10^{-5})}\frac{COR^2}{A} + \underset{[2.16]}{.604(10^{-11})}\frac{COR^3}{A}$
4.9	.079	$\frac{C}{A} = \underset{[17.1]}{.480(10^{-2})} + \underset{[6.00]}{.300(10^{-1})}\frac{EA}{A}$
4.10	.015	$\frac{C}{A} = \underset{[97.7]}{.293(10^{-1})} - \underset{[2.66]}{.133(10^{-8})}A$

Note: R^2 is the adjusted multiple coefficient of determination. Other abbreviations are defined in Table 3. Numbers in brackets beneath coefficients are absolute values of calculated t statistics of the net regression coefficients.

sion focuses on the Q, Q*, and COR equations.

A. The Assets Effect

All equations in Table 4 have non-zero intercepts, resulting in an assets effect. That is, for any given level of output, an increase in assets reduces cost. The magnitude of the assets effect is measured as follows:

1. Equation 4.1 is transformed into an average cost equation:

$$AC = -.235(10^{-2})\frac{A}{Q} + .771 - .478(10^{-5})\,Q + .245\,(10^{-10})\,Q^2. \quad (10)$$

2. A/Q in equation 10 is then fixed at three alternative values—its mean (25.63) and the mean ± three standard deviations (the standard deviation of A/Q is 4.527).

3. Using each of the three equations obtained by fixing A/Q at alternative values, average costs are calculated at minimum, mean, optimum (where predicted average cost is minimal), and maximum observed output.[21] The results of these calculations are shown in Table 5.

TABLE 5

Predicted Average Cost at Selected Output and Assets-to-Output Values
(Output in millions of dollars)

A/Q	Minimum Q .0139	Mean Q .550	Optimum Q 9.76	Maximum Q 17.2
12.05	.742	.717	.510	.645
25.63	.710	.685	.478	.613
39.21	.678	.653	.446	.581

Note: Average-cost estimates are based on equation 4.1. Abbreviations are defined in Table 3. Average cost for the smallest bank with A/Q of 12.05 may be read as 74.2 cents per dollar of output.

Reading down the columns of Table 5, the assets-effect cost reductions range from 8.6 percent among the smallest banks to 12.5 percent among optimum-size banks. However, expansion of output from lowest to optimum value, with mean A/Q, results in a 32.7 percent cost reduction. In moving from optimum to maximum output, average cost is increased 28.4 percent.

Interpretation of the assets effect is considerably more difficult than measuring its quantitative importance. Consider that:

$$Q \cong r\,(EA), \quad (11)$$

where Q is output, EA is earning assets, and r is the average rate of return on EA. If increases in total assets generally imply increases in EA, they must also imply decreases in r since the assets effect occurs in the context of a fixed Q. Thus, at issue is why banks with an output structure emphasizing low rates of return and a high volume of earning assets have low costs. Differences in input mixes among banks may explain this phenomenon. High-asset banks generally have low time-to-demand deposit ratios. Since the interest rate on demand deposits is legally fixed at an artificially low level, individual banks purchase all of the factor reflected in demand deposits that the public will offer at the prevailing interest rate.[22] But, the amount any given bank can purchase is limited by the characteristics of the market in which it operates.[23]

If we write the individual bank's production function as follows:

$$Q = f\,(D, T, E), \quad (12)$$

where D is demand deposits, T is time deposits, and E represents all other factors of production, this argument implies:

$$\frac{\partial Q/\partial D}{MC_D} > \frac{\partial Q/\partial T}{MC_T} \cong \frac{\partial Q/\partial E}{MC_E} \quad (13)$$

where $\partial Q/\partial D$, $\partial Q/\partial T$, and $\partial Q/\partial E$ are marginal physical products of the inputs, and MC_D, MC_T, and MC_E are marginal costs. The productivity-cost ratios of T and E are approximately equilibrated as a result of profit-maximizing behavior, but these ratios are always lower than that for D.[24] Banks fortunate or astute

[21] Optimum output is calculated at mean A/Q. The estimated elasticity of A with respect to Q exceeds 0.9 at mean Q.

[22] That is, demand-deposit rates are more effectively constrained than the prices of other bank inputs. The legal constraint on demand-deposit rates is circumvented by payments in kind, but deviations from the zero legal rate are limited and payments in kind presumably are less than the payments that would be made in the absence of legal impediments.

[23] "Characteristics of the market" subsumes a host of factors bearing on the degree to which a bank is isolated from competition and the local demand for commercial bank liabilities.

[24] A more complicated system of inequalities can prevail when time deposit interest ceilings are effective or when other regulatory constraints are brought to bear.

enough to be located in markets that generate relatively great amounts of demand deposits—these are the banks with high A/Q—substitute demand deposits for other high-cost factors and consequently experience lower costs. This explanation of the assets effect is offered as a plausible, but untested hypothesis.[25]

B. Fixed Costs

Since the cost curve intercepts provide evidence on the presence of fixed costs, the reciprocal of assets was introduced as an independent variable.[26] The results proved ambiguous. For example, introduction of the reciprocal of assets in equation 4.1 resulted in loss of the cubic output term. Thus, the cost function can be expressed as cubic in output with the reciprocal of assets omitted, or the reciprocal of assets can be included and the cost function becomes quadratic in output. The latter means that the average cost curve approaches linearity as output is increased; the constant adds a hyperbolic tail at the lower end of the output scale. The cubic expression yields a "U" shaped average-cost curve.

Differences between coefficients of determination are hardly great enough to serve as a basis for confident discrimination. In equation 4.1, the quadratic form explains 2 percent more variance than the cubic form. However, predicted average costs differ widely depending on the choice made, especially at the extremes of the output range. If the true cost equation includes both intercept and cubic output terms, omission of the former will result in underestimating average cost at low levels of output, and omission of the latter will result in underestimating average cost at higher output levels. The following discussion employs the cubic alternative without intercept.[27]

C. Alternative Output Measures Reconsidered

Q and Q* are preferable to COR because they are largely insensitive to interfirm price variation. However, COR explains approximately 10 percent more variation in total costs than either Q or Q*. The higher coefficient of determination associated with COR probably reflects some correlation between input and output prices and, therefore, points up the key advantage of Q and Q*. It also, unfortunately, points up a major shortcoming of the cost measure.

In terms of the cost-curve contours, Q and Q* also differ from COR. Equations 4.1 and 4.2 are cubic in output while equation 4.3 is quadratic. In the Fifth District sample, where all three cost curves are cubic, the coefficient on the cubic COR term is smaller than either of the corresponding Q or Q* coefficients. In addition, the t value associated with the cubic term of the COR equation is lower (2.16) than the corresponding values for Q (3.54) and Q* (3.56). This indicates that the price sensitivity of COR results in overstatement of output among larger banks.

D. A Finding: "U" Shaped Average Cost Curves

The derived average-cost equations are "U" shaped in both the Tenth and Fifth Districts, irrespective of whether Q or Q* is used. In equations 4.1, 4.2, 4.6, 4.7, and 4.8, the optimum rate of output lies between 57 and 62 percent of the largest observed rate of output (equation 4.3 indicates monotonically decreasing average costs.) Although the optimum-size bank is far smaller than the largest sample banks, in no instance does more than

[25] A direct test of the inequality hypothesis would require knowledge of the production-function parameters, about which little is known.

[26] The intercept can be misleading because zero output is not observed.

[27] Omission of the intercept does not alter the general contour of the average-cost curve.

2 percent of the sample operate on the rising portion of the average cost curve, and the preponderant majority of banks are far smaller than optimum size. Equations 4.1 and 4.2 indicate that a movement from lowest observed output to optimum output is accompanied by a 33 percent decline in average costs.[28] However, a movement from smallest to optimum size represents a 700-fold increase in output.

Corresponding cost equations for the Fifth and Tenth Districts are not comparable for at least two reasons. Since they were estimated separately for the two Districts, output weights on given types of earning assets differ between Districts.[29] Therefore, the output measures are price-sensitive between Districts.[30] The second consideration inhibiting inter-District comparisons relates to the presence of branch banking in the Fifth District. Comparison of Tenth and Fifth District firms with equal output results in the Fifth District firms having lower output per plant (banking office).

E. Branch Banking

To isolate the cost effects of branch banking, Fifth District banks were divided into sub-samples including banks operating branches and those without branches. Equations of the type shown in Table 4 were fitted to each of the sub-samples, and a branch code variable was entered in the branch-bank sub-sample equations.[31] Table 6 describes properties of selected variables. Notice that branch systems are generally combinations of above-average size unit banks. Table 6 also indicates that the largest unit banks in the Fifth District are smaller than the optimum size banks in the Tenth District. This may reflect the cost advantages of plant additions beyond a certain output size. Fifth District banks may forestall rising costs by adding branches.[32]

Table 7 describes the Fifth District sub-sample cost equations with and without the branch-code variable. Prior to adding the branch-code variable all equations are quadratic, implying linear average cost curves. That the unit bank sub-sample is best characterized by linear average costs comes as no surprise. All the observations in this group are along

[28] This is a lower-limit estimate of the decline in costs, since the equations tend to underestimate costs for the smallest banks as a result of omitting the intercept term.

[29] Twelve of the 16 earning-asset categories have higher coefficients in the Tenth District than in the Fifth District (see Table 1). These 12 asset categories account for 84 percent of total assets in the Tenth District and 77 percent in the Fifth District.

[30] Pooled output estimating equations would have permitted inter-District cost comparisons.

[31] The branch data came from a secondary source, and the branch-code variable is an arbitrary function of the number of branches each bank operates.

Code	Number of branches	Frequency (Number of banks)
0	0	282
1	1	57
2	2	27
3	3	16
4	4	5
5	5-9	14
6	10-14	4
7	15-19	6
8	20-49	1
9	50 and more	1
		413

Limited-function facilities are not considered branches.

[32] In the Tenth District, where branch banking is legally proscribed in all states except New Mexico, correspondent banking is a substitute avenue for bank growth. As of December 1961, 11.4 percent of total deposits at Fifth District Reserve City banks were correspondent liabilities, but 20.4 percent was the corresponding value for Tenth District Reserve City banks. *Summary Report: Assets and Liabilities of Member Banks,* Washington: Board of Governors of the Federal Reserve System, December 30, 1961.

TABLE 6

Selected Properties of Variables for Fifth District Sub-samples
(Dollar amounts in hundreds)

	Q	Q*	COR	EA	A	C	br code
				282 Unit Banks			
Range							
Lower	$ 150	$ 171	$ 171	$ 3,829	$ 4,770	$ 126	
Upper	35,408	39,154	37,492	721,389	963,026	18,595	
Mean	2,634	2,935	2,807	57,833	72,120	1,913	
Median	1,720	1,912	1,889	37,906	47,017	1,392	
Standard deviation	3,520	3,930	3,577	75,260	99,392	2,037	
				131 Branch Banks			
Range							
Lower	$ 1,205	$ 1,353	$ 1,242	$ 29,868	$ 32,734	$ 806	1
Upper	207,909	232,063	220,381	4,304,960	5,797,665	142,362	9
Mean	17,910	19,837	18,642	354,891	461,833	12,380	2.534
Median	6,561	7,318	6,553	126,881	160,739	4,847	2
Standard deviation	35,451	39,442	36,585	713,717	964,220	23,050	1.192

Note: Abbreviations are defined in Table 3 and footnote 31.

the falling segments of equations 4.6, 4.7, and 4.8. However, the branch-bank subsample results are somewhat anomalous.[33] The average-cost curves derived from equations 7.6a, 7.6b, and 4.6 are shown in Chart 1. It would appear that the disparate influence of units banks at lower-output levels and of branch banks at higher output levels accounts for the finding of curvilinearity for the aggregate sample. This brings into question the finding of rising costs among the larger Fifth District banks.

Introduction of the branch-code variable results in loss of the squared-output terms. The average-cost curves are hyperbolic in output. Equations 7.6c and 7.7c indicate that a bank adds $16,900 to operating costs by moving from one branch category to the next, while holding output constant.

[33] Paucity of data is a problem; the sample contains abundant information on small banks, but little pertaining to large banks. The cubic terms of the branch-bank equations—section b of Table 7—generate t ratios of 1.49, 1.80, and 1.78, respectively.

Evaluation of the costs of branch banks vis-à-vis unit banks begins with the premise that branch banks, effectively, are collections of unit banks; each branch is a substitute for a unit bank of equal size.[34] Equations 7.6a and 7.6c serve as the bases for comparison. Fixing A/Q at its mean, the average-cost equation for branch banks becomes:

$$AC_B = .702 + .169(10^3)\frac{br}{Q}. \quad (14)$$

The average-cost equation for unit banks, derived from 7.6a, is:

$$AC_U' = .802 - .104\,(10^{-4})\,Q. \quad (15)$$

In order to render the unit and branch-bank equations comparable, equation 15 is adjusted to reflect the number of offices operated by branch banks with equal output:

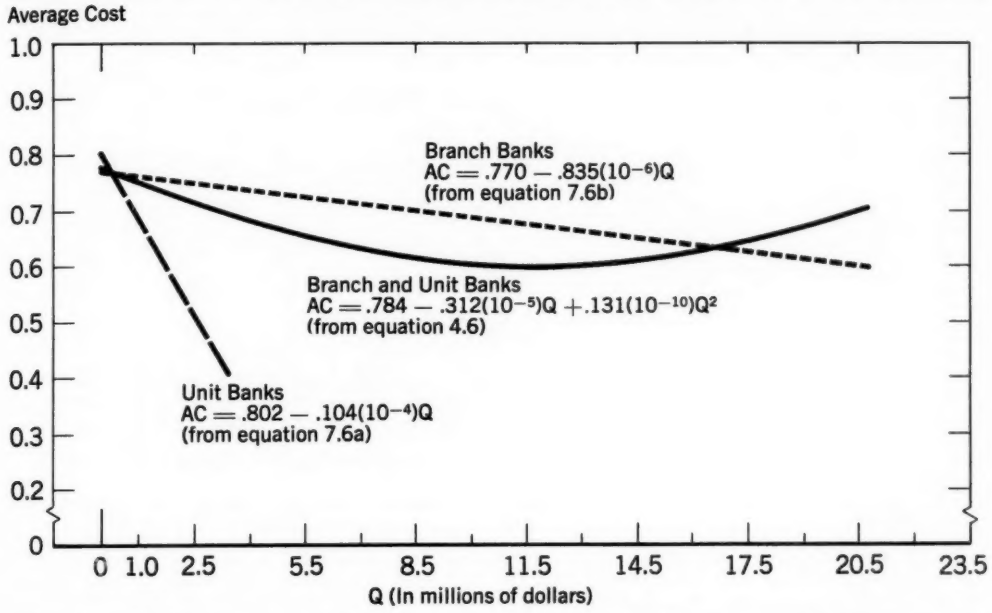
$$AC_U = .802 - .104(10^{-4})\frac{Q}{br^*}, \quad (16)$$

where br* is the mean number of bank offices associated with each branch-code

[34] Earlier studies implicitly assumed that

CHART 1

Average Cost Curves for Fifth District Aggregate Sample and Branch and Unit Sub-samples



value (see footnote 31). Further to simplify comparison, a new expression is formulated indicating the percentage difference in AC_U and AC_B:

$$\triangle AC = \frac{AC_U}{AC_B} - 1 = \frac{.802 - .104(10^{-4})\dfrac{Q}{br^*}}{.702 + .169(10^3)\dfrac{br}{Q}} - 1. \quad (17)$$

Table 8 shows $\triangle AC$ for each branch-code value at minimum and maximum observed output and where AC_U minus AC_B is a maximum. Interpretation of Table 8 will be facilitated by considering the general shapes of AC_U, AC_B, and $\triangle AC$ (see Chart 2). For any observed branch code value, AC_U is linear and AC_B is hyperbolic in output. AC_U intersects AC_B twice, once at low output and again at high output. At these points of intersection, $\triangle AC = 0$. To the left of the low-output intersection $AC_B > AC_U$, and likewise to the right of the high-output intersection. These are output values at which $\triangle AC < 0$. Between the two points of intersection $AB_B < AC_U$ and $\triangle AC > 0$. Thus, $\triangle AC$ is negative at the lowest output values. As output increases $\triangle AC$ rises, becomes positive, reaches a maximum, and declines to negative values at the highest output levels. Since this $\triangle AC$ variation takes place in the context of fixed branch-code values, it indicates that branch-bank costs generally compare unfavorably with unit-bank costs when average branch size is extreme, either small or large. In the intermediate range, branch-bank costs compare favorably with those of comparable collections of unit banks.[35]

Since the sample observations cover

branch banks are substitutes for unit banks of equal size, without consideration of the difference in number of offices.

[35] These comparisons do not allow for variations in the size distribution of branches within firms. Data on branch-size distributions were unavailable.

TABLE 7

Total-Cost Functions Using Alternative Measures of Output for the Sub-samples of the Fifth District

Equation number	R^2	
		282 Unit Banks
7.6a	.619	$\frac{C}{A} = \underset{[10.3]}{-.216(10^{-2})} + \underset{[21.0]}{.861}\frac{Q}{A} - \underset{[6.12]}{.104(10^{-4})}\frac{Q^2}{A}$
7.7a	.618	$\frac{C}{A} = \underset{[26.8]}{-.562(10^{-2})} + \underset{[20.9]}{.857}\frac{Q^*}{A} - \underset{[6.20]}{.831(10^{-5})}\frac{Q^{*2}}{A}$
7.8a	.704	$\frac{C}{A} = \underset{[10.7]}{-.204(10^{-2})} + \underset{[26.0]}{.780}\frac{COR}{A} - \underset{[4.61]}{.636(10^{-5})}\frac{COR^2}{A}$
		131 Branch Banks
7.6b	.587	$\frac{C}{A} = \underset{[3.91]}{-.129(10^{-2})} + \underset{[13.4]}{.802}\frac{Q}{A} - \underset{[3.35]}{.835(10^{-6})}\frac{Q^2}{A}$
7.7b	.588	$\frac{C}{A} = \underset{[13.7]}{-.453(10^{-2})} + \underset{[13.3]}{.799}\frac{Q^*}{A} - \underset{[3.38]}{.682(10^{-6})}\frac{Q^{*2}}{A}$
7.8b	.703	$\frac{C}{A} = \underset{[3.19]}{-.906(10^{-3})} + \underset{[17.3]}{.745}\frac{COR}{A} - \underset{[3.12]}{.621(10^{-6})}\frac{COR^2}{A}$
		131 Branch Banks with Branch Code Variable Added
7.6c	.602	$\frac{C}{A} = \underset{[7.97]}{-.263(10^{-2})} + \underset{[12.8]}{.767}\frac{Q}{A} + \underset{[4.02]}{.169(10^{3})}\frac{br}{A}$
7.7c	.602	$\frac{C}{A} = \underset{[17.7]}{-.584(10^{-2})} + \underset{[12.8]}{.767}\frac{Q^*}{A} + \underset{[4.02]}{.169(10^{3})}\frac{br}{A}$
7.8c	.714	$\frac{C}{A} = \underset{[7.29]}{-.204(10^{-2})} + \underset{[16.7]}{.720}\frac{COR}{A} + \underset{[3.81]}{.137(10^{3})}\frac{br}{A}$

Note: R^2 is the adjusted multiple coefficient of determination. Other abbreviations are defined in Table 3 and footnote 31. Numbers in brackets beneath coefficients are absolute values of calculated t statistics of the net regression coefficients.

only a segment of each $\triangle AC$ curve, the above generalization involves some extrapolation. Columns 4 and 5 of Table 8 indicate the range of observed output for each branch-code value. If the values in these columns straddle the output value in column 7, the $\triangle AC$ at maximum AC_U minus AC_B is observed. Consider the case of branch banks with two offices (branch code value = 1). At minimum observed output, unit-bank costs are 5.5 percent lower than those of branch banks. However, as output increases, the average costs of branch banks fall more rapidly than those of unit banks, and at an output of $.5701 million unit-bank costs are 5.5 percent higher than those of branch banks. Thereafter, branch-bank costs decline more slowly than those of unit banks, and for the largest observed branch bank with two offices the cost advantage is 4.2 percent. Negative $\triangle AC$ is not observed among large two-office branch banks, but is observed among large branch banks with branch-code values of 2, 6, and 7.

TABLE 8

Percentage Difference in Average Cost of Branch Banks and Comparable Collections of Unit Banks
(Dollar amounts in millions)

Branch code value (offices)	△ AC at observed		Observed		Where AC_U-AC_B = maximum		Sample branch banks with		
	Minimum Q	Maximum Q	Minimum Q	Maximum Q	△ AC	Q	$AC_B > AC_U$		$AC_B < AC_U$
							Low Q	High Q	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1 (2)	-5.5%	4.2%	$ .1205	$ 1.015	5.5%	$ .5701	7	–	50
2 (3)	-4.7	– 7.9	.2605	4.255	4.3	.9874	6	1	20
3 (4)	-6.8	2.6	.3395	2.255	3.8	1.396	6	–	10
4 (5)	-3.7	3.4	.5744	1.640	3.4	1.803	1	–	4
5 (8)	-0.8	2.2	.8995	5.215	4.6	2.550	1	–	13
6 (13)	2.3	-10.0	1.458	20.72	6.0	3.560	–	1	3
7 (18)	6.4	– 1.6	6.076	18.02	6.6	4.525	–	1	5
8 (26)	6.2		10.96		7.4	5.814	–	–	1
9 (51)	7.2		20.79		8.9	8.636	–	–	1
Total							21	3	107

Note: △ AC is calculated using equation 17.

The last three columns of Table 8 indicate that the preponderant majority of sample branch banks operate at lower average cost than comparable collections of unit banks. Of the 24 cases where branch banks compare unfavorably with unit banks, 21 are branch banks with low output per office. It seems likely that at least some of these banks were operating recently opened branches and were sustaining extraordinary costs.[36]

F. Plant and Firm Effects

Average costs were expected to be influenced by both plant size and firm size. A change in firm output, holding average plant output constant, should give rise to a "firm effect" on average cost. On the other hand, an increase in average plant size, while holding firm size constant should give rise to a "plant effect."

The question of independent plant and firm effects has considerable policy relevance. If all economies of scale are directly attributable to increases in plant size, the advantages of branch banking are questionable since unit banks and branch banks, at least legally, are equally capable of adjusting plant size. Whatever cost advantages inhere in branch banking should be attributable to their singular ability to adjust firm size without changing average branch size.[37]

Equation 14, the branch-bank average-cost equation used in Table 8, does not display independent plant and firm effects. Average-cost variation stems solely from variation in the size of plants. The curious absence of independent firm effects led to a reexamination of the regression results. Among the equations from which equation 14 was selected, there appeared the following:

[36] Newly-formed banks were excluded from the sample, but no adjustments were made to account for banks with newly-opened branches.

[37] Plant and firm effects may be interdependent. Greater firm size may facilitate achievement of larger plant size. Such dependence could confound attempts to estimate plant and firm effects.

TABLE 9

Average Cost and Elasticity of Average Cost with Respect to Firm Effect and Plant Effect at Minimum and Maximum Observed Output Values *

Branch code value (offices) (1)	Average cost at		Firm effect elasticity at		Plant effect elasticity at	
	Minimum Q (2)	Maximum Q (3)	Minimum Q (4)	Maximum Q (5)	Minimum Q (6)	Maximum Q (7)
1 (2)	.831	.730	−.001	−.007	.132	.018
2 (3)	.822	.707	−.002	−.030	.123	.009
3 (4)	.837	.729	−.002	−.015	.139	.024
4 (5)	.811	.746	−.003	−.011	.113	.043
5 (8)	.791	.709	−.006	−.036	.093	.018
6 (13)	.769	.624	−.009	−.164	.071	.006
7 (18)	.707	.638	−.042	−.139	.022	.008
8 (26)	.678		−.080		.014	
9 (51)	.626		−.164		.009	

* See Table 8 for minimum and maximum observed-output values.
Note: Average-cost estimates are based on equation 19. Elasticity estimates are based on equations 19, 21, and 22.

$$C/A = \underset{(6.48)}{-.214(10^{-2})} + \underset{(12.9)}{.775}\frac{Q}{A} - \underset{(1.82)}{.493(10^{-6})}\frac{Q^2}{A} + \underset{(2.87)}{.132(10^{3})}\frac{br}{A}$$

$$R^2 = .609. \qquad (18)$$

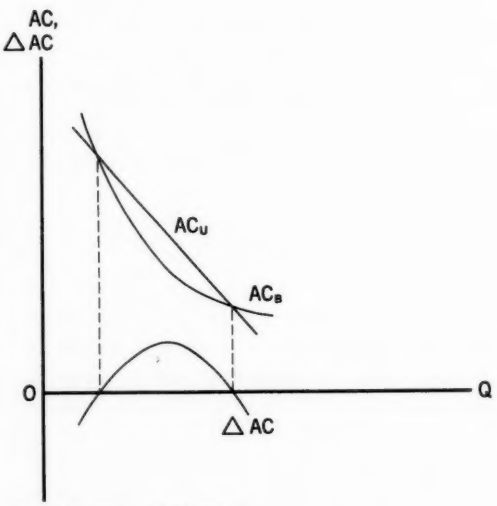
At mean A/Q, the derived average cost equation is:

$$AC = .722 - .493(10^{-6})\,Q + .132(10^{3})\frac{br}{Q}. \qquad (19)$$

Equation 18 was initially rejected because the coefficient on Q^2/A was less than twice its standard error ($t = 1.82$).[38] In view of the arbitrary cardinality of the branch-code variable, the possible interdependence of plant and firm effects, and the proximity of the critical region, the rejection of equation 18 appears open to question.

CHART 2

Average Costs and Percentage Difference in Average Costs for Branch and Unit Banks for a Given Branch Code Value



Note: See equations 14, 16, and 17.

Equation 18 describes a firm effect as well as a plant effect. Write the total dif-

[38] The null hypothesis ($c_i = 0$) is rejected at the 7 percent level, but not at the 4.55 percent level. Prior to the introduction of the branch-code variable, the coefficient on Q^2/A was different from zero at the 4.55 percent level.

ferential of average cost as follows:

$$d\,AC = \frac{\partial\,AC}{\partial\,Q}\,d\,Q + \frac{\partial\,AC}{\partial\left(\frac{br}{Q}\right)}\,d\left(\frac{br}{Q}\right). \tag{20}$$

An increase in output can be achieved by increasing office size, or by adding offices and leaving their average size unchanged. In the latter case, $d(br/Q) = 0$. Since the firm's output is increased, but output per plant is unchanged, we refer to $(\partial\,AC/\partial Q)dQ$ as the firm effect. When output is expanded through a fixed number of branches, the total differential is the sum of a plant and a firm effect. The plant effect is $\partial AC/\partial(br/Q)\,d(br/Q)$.

Average cost elasticities with respect to firm effect and plant effect are defined as follows:

$$\eta_f = \frac{\partial\,AC}{\partial\,Q} \cdot \frac{Q}{AC}, \tag{21}$$

$$\eta_p = \frac{\partial\,AC}{\partial(br/Q)} \cdot \frac{(br/Q)}{AC} \tag{22}$$

Table 9 presents calculated firm- and plant-effect elasticities along with average-cost estimates at the extremes of observed output for each branch-code value. Thus, average costs range from 83.1 cents per dollar of output among the smallest banks with a branch-code value of one, to 62.4 cents per dollar of output among the largest banks with a branch-code value of six.

The firm elasticities are negative, indicating that average costs fall as firm size increases and plant size is unchanged. Moreover, the firm elasticities become larger absolutely as firm size increases. Thus, for the smallest banks with a branch-code value of one, a doubling of output results in a 0.1 percent decline in average cost, while the largest bank experiences a 16.4 percent decline in average cost as a result of a doubling of output.[39] Plant-effect elasticities are positive, indicating that as branch size decreases—br/Q increases—average costs rise. The plant elasticities are considerably larger among small banks than among large banks. The smallest bank with a branch-code value of one experiences a 13.2 percent increase in average cost as a result of a halving of average plant size, but among the largest banks the average cost increase is only 0.9 percent.

The logic of the plant effect is compelling and obvious. It has been discussed by virtually all who have undertaken bank cost studies. If a bank cuts plant output in half while holding firm output fixed, it merely produces the same output through twice as many branches. The resulting increase in overhead costs is bound to influence results. On the other hand, the firm effect is both more subtle and more important for policy questions regarding banking structure. The existence of a firm effect is an argument in favor of branch banking on cost grounds, for unit banks are incapable of expanding firm size through means other than plant expansion. The key to the cost issue, from the public policy standpoint, would appear to lie in the question of the quantitative importance of the firm effect. Although the evidence of a firm effect presented in this paper is by no means overwhelming, the orders of magnitude of the estimated elasticities suggest that the potential importance of the firm effect is considerable.

IV. Conclusions

The principal aim of this study has been to test various hypotheses concern-

[39] Output increases of 100 percent are used for illustrative purposes. Since the elasticity estimates pertain only to the immediate vicinity of the output value for which they are calculated, they are not apt to be accurate for a doubling of output.

ing the cost-output relationship in commercial banking. Since the measures of bank output used or suggested in earlier studies were found to be conceptually deficient, a new measure of output was developed giving explicit recognition to the diversity of bank output and inter-bank price differences resulting from imperfect markets. Output is defined as the operating earnings a bank would have if it earned "standard" rates on each class of earning assets. "Standard" rates and earning-asset classes were obtained by experimenting with regressions of the type shown in equation 1. The selected definitions are shown in Table 1. Current operating expense was used as a measure of cost. Various total-cost equation structures were fitted and average-cost equations were derived from those that appeared most plausible.

In the Kansas City District, where unit banking is prevalent, "U" shaped average cost curves were observed. Expansion from smallest to optimum size results in at least a 33 percent reduction in average cost. However, the range of output is quite large, and the optimum-size firm is approximately 700 times as large as the smallest observed firm. The optimum rate of output is about 60 percent of the maximum observed rate, but less than 2 percent of the sample is larger than optimum size. Thus, modest economies of scale appear to prevail over a large range of output, and few banks operate under rising costs. There is also evidence suggesting that the smallest banks operate under sharply declining costs.

Richmond District banks were divided into unit and branch-bank subsamples, and costs were related to output and to a variable measuring the number of offices each bank operates. The unit-bank sub-sample of the Richmond District is best described with a negatively-sloped linear average-cost curve. However, the largest bank in this subsample is smaller than the optimum-size bank in the Kansas City sample. The absence of large unit banks operating under rising costs in the Fifth District may be the result of branch banking. Fifth District banks can forestall rising costs by acquiring additional plants instead of increasing the output of existing facilities. In effect, unit banking imposes both a low-level optimum-output rate and high average costs upon firms.

The separate sub-sample cost equations were used to compare the cost performance of branch banks with collections of unit banks having the same output and number of offices. These comparisons indicated that branch banks operate at lower average cost, at most comparable levels of output. Additional tests revealed evidence of both plant and firm effects on costs. An increase in output, holding average plant size constant, results in reduced average cost; and an increase in average plant size, holding total output constant, also results in lower average cost.[40] Thus, under a regime of branch banking, economies may be derived that are impossible in a unit-banking environment. When unit banks are merged into multi-office firms, costs are reduced, even if the output of each office is left unchanged.

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[40] The average-cost equation of the branch-bank sub-sample was of the following general form:

$$\frac{C}{Q} = c_0 + c_1 Q + c_2 \frac{br}{Q},$$

where C is current operating expense, Q is the measure of output, br is the branch variable, and c_0, c_1 and c_2 are calculated net regression coefficients. Tests indicated $c_1 < 0 < c_2$.

► EDWIN W. HANCZARYK

Growth and Performance of Common Trust Funds in 1966

At the end of 1966, the 497 banks and trust companies which operated 1,089 common trust funds had assets exceeding $7.6 billion. This represented an increase during the year of $82.9 million, or 1.1 percent, and a rise in the number of funds of 73, or 7.2 percent.[1] Over the three-year period, December 31, 1963 to December 31, 1966, the increases were $3.07 billion in assets, or 67.7 percent, and 396 funds, or 57.1 percent (see Appendix, Table 1).

During the year, a decline in assets of equity and diversified funds was more than offset by increases in assets of fixed-income and tax-exempt funds. The number of equity, fixed-income, and tax-exempt funds increased while the number of diversified funds decreased (see Table 2). On the average, equity funds tend to be smaller, while tax-exempt and diversified funds are larger (see Table 3).

In the period 1963-1965, common trust funds exhibited particularly rapid growth, the impact of rising security prices being reinforced by a net inflow of new funds. During 1966, however, additions to new and existing accounts barely offset the sharp declines in security prices. A reported net inflow of $957 million yielded a net increase of common trust fund assets of only $82.9 million.

Banks have been shifting trust accounts or portions of such accounts into common trust funds. But it is not possible to determine from available data how far this has taken place.

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[1] 103 new funds were established in 1966, but merger and liquidation reduced the increase to 73.

I. Types of Funds

Many banks operate a variety of common trust funds designed to meet the specific investment requirements, tax status, and other needs of the beneficiaries. In 1966, the combinations most often observed were:

Types of Funds Operated	Number of Banks
Diversified fund only	163
Fixed-income and equity	124
Equity fund only	16
Diversified and equity	13
Diversified and fixed-income	10
Three or more funds	162
Other	9 *

* Less frequently observed were banks with a fixed-income fund only, tax-exempt fund only, tax-exempt and equity, and tax-exempt and diversified funds.

The increase in tax-exempt funds was spurred by the elimination, in 1963, of the $100,000 ceiling on single-account participations.[2] Typically, the trust accounts invested in tax-exempt securities are larger, and the beneficiaries have income tax rates high enough to justify investment in lower-yielding securities. The average account in tax-exempt funds exceeded $58.8 thousand at the end of 1966, while the average for all common trust funds was $25.8 thousand. Many tax-exempt funds have individual accounts in excess of $100,000; the largest had an average participation of $143,540.

[2] At present, the only limitation on single-account holdings in common trust funds provides that no account may own more than 10 percent of the assets. Under Regulation F of the Federal Reserve, the maximum participation for each account in a common trust fund was initially $25,000; that was later changed to $50,000 and then to $100,000. Regulation 9, which now prevails, has no maximum. There are, however, other limitations under state law.

II. Shares of the Market

At the end of 1966, national banks constituted 65.3 percent of the 497 banks operating common trust funds, they had 64.1 percent of the 1,089 funds, and they held approximately 45.9 percent of the $71.6 billion of common trust fund assets. This represented a substantial increase over 1962, when national banks constituted 60 percent of the banks operating common trust funds, had 58 percent of the funds, and held approximately 36 percent of all common trust fund assets.

III. Investment Holdings

The asset composition of common trust funds at the last valuation dates in 1965 and 1966 are shown in Table 4. The proportion of common stock holdings decreased in 1966, while that of tax-exempt securities increased. In 1966, common stock holdings comprised 40.5 percent of the assets of common trust funds, compared with 44.2 percent in 1964 and 50.7 percent in 1963. Additions to portfolios of common stocks were outweighed by losses resulting from declining stock prices. Tax-exempt securities increased from $1.12 billion to $1.36 billion, or 20.7 percent. The absolute and relative holdings of short-term U.S. Government and agency securities, corporate and foreign bonds, private placements, mortgages, and other assets increased during the 12-month period. The absolute and relative holdings of cash, U.S. Government securties with maturities of over a year, and preferred stock, decreased.

IV. Market Influence

Despite the growth in importance of common trust funds, their market influence and their importance among bank investments are small. For example, at the end of 1966 common trust funds held $673.5 million of U.S. Government and agency securities. This represented only

0.2 percent of the $329.8 billion of direct and fully-guaranteed securities outstanding, less than 0.3 percent of the $273.52 billion of publicly-guaranteed obligations not owned by the U.S. Treasury, and about 1.2 percent of the $57.2 billion held by commercial banks outside their trust departments. The common trust fund holdings of $1.36 billion of tax-exempt securities represented only 1.36 percent of the approximately $100 billion of outstanding state and local government debt, and 3.5 percent of the $39 billion held by commercial banks. Mortgages held by common trust funds ($205.9 million) were a negligible percentage (0.06 percent) of the $366 billion of mortgage debt outstanding at the end of 1966, and about 0.4 percent of the commercial bank holdings of $54,704 million. The market value of shares listed on the New York Stock Exchange alone was $482.54 billion; common trust funds held $3.08 billion of common stock.[3]

V. *Common Trust Funds and Bank Size*

Assets of common trust funds tend to be concentrated in large banks. Although almost all banks with assets of $500 million or more, and 60 percent of the banks with assets of $100 to $500 million, operate common trust funds, the preponderant majority of smaller banks do not. Table 5 shows the distribution of common trust funds, participations, and assets according to bank size.[4] Larger banks have more funds per bank, larger funds on the average, and larger average account participations. Concentration of assets in large banks is more pronounced than the concentration in number of funds.

During the period 1964-1966, banks in Pennsylvania, New York, California, Massachusetts, and Illinois had the largest amounts of common trust fund assets. In 1966, these five states accounted for 29.4 percent of the banks operating common trust funds and 55.7 percent of the assets. The greatest growth in fund assets during 1966 took place in Michigan, Illinois, North Carolina, Delaware, Utah, and Washington. More than 10 percent of the banks operated common trust funds in Hawaii, Arizona, Rhode Island, Delaware, Pennsylvania, Vermont, Idaho, and Nevada. The largest percentages of banks operating common trust funds were found in Hawaii, Arizona, Rhode Island, and Delaware.

VI. *Investment Performance*

Table 7 shows comparisons, first, of median percentage changes in unit share values of equity funds and Standard and Poor's Composite (500-stock) Index, and second, of median yields of equity funds and dividend yields (monthly averages) of the Composite Stock Index. The comparisons are for 1963, 1964, and 1965—years of generally rising stock prices—and for 1966, when stock prices generally declined. In the rising markets of the earlier years, median percentage appre-

[3] What is true of common trust funds is not true of bank trust departments as a whole. A study by the New York Exchange of institutional activity on the Exchange, covering the period October 24-28, 1966, showed commercial banks to be (as in 1963) the most important institutional investor group, accounting for 35.7 percent (in the survey week) of all institutional orders executed on the Exchange. The share accounted for by mutual funds was 25.8 percent of institutional purchases and sales. Bernard Graham, "The Institutional Investor," *Trusts and Estates*, August 1967, p. 727.

[4] Some states (for example, New York) have statewide funds (actually, mutual investment funds) in which the only permitted participants are trusts administered by New York banks which do not themselves maintain legal common trust funds. There is no public offering of the state fund's shares, and the only reason why the common trust fund device was not used is that the scheme does not fall within the IRS definition of a common trust fund.

ciations in share values of equity common trust funds fell below percentage changes in the Standard and Poor's Stock Index, while these funds outperformed the 1966 declining market. The superior performance of equity funds in 1966 occurred for all valuation dates normally used, though the superiority was greatest for funds valued at the end of October and December. The number of funds with an October valuation date was by far the greatest.

In yield comparisons, equity funds outperformed the market in the years of generally rising stock prices, and fell below the market when the market generally declined. In view of stock price (and unit share price) trends, yields on equity funds may have been overstated in 1963, 1964 and 1965, and understated in 1966, when compared with market dividend yields on a monthly average basis.

Despite the understatement of yields in 1966, on the average, total performance of equity funds (percent change in unit share value plus yield) was superior to Standard and Poor's Stock Price Index plus the dividend yield. For the greater number of funds valued at the end of October, the superiority was 1.4 percentage points. For December funds, it was 2.2 percentage points, while the performance of November funds approximately equalled the change in market averages.[5]

A. Performance by Bank Size and Common Trust Fund Size

Equity funds were grouped according to bank size and common-trust-fund size, in order to determine whether these factors related in any way to performance characteristics (Tables 8 and 9). The greater opportunities of larger banks and larger funds to secure more adequate diversification of investments and to invest at lower costs (in round lots rather than odd lots) were not reflected in performance measures. Though larger funds ($2 million and over), on the average, showed better performance than smaller funds, when size of bank was taken into account fund size and performance were not related in any simple fashion.

Among banks with assets of less than $100 million, larger funds performed, on the average, better than smaller funds. For a given bank size, however, the smaller funds sometimes performed better than the larger funds. Many smaller funds operated by larger banks performed, on the average, as well or better than the larger funds operated either by larger or smaller banks. Thus, variation for each of the groups in Tables 8 and 9 was considerable, and within any group there were funds that performed better than the average of any other group. This is true whether funds of all valuation dates are grouped together (Tables 8 and 9), or are analyzed separately by valuation dates (Table 10). One can hypothesize that, other things being equal, smaller trust funds will perform better if they are operated by larger banks, that smaller banks will perform better with larger rather than smaller funds, that common trust funds of larger size can be operated equally well by larger or smaller banks. In fact, however, other things are not equal.

B. Longer-Term Performance

In a previous trust analysis, Stanley Silverberg was forced by lack of data to write: "Twelve months is too short a period for any very meaningful evaluation of common trust performance. If many equity common trust funds are more defensive in character than the composition of the market averages we would expect those funds to perform better than market averages in periods of market weakness. It is only over a

[5] The total performance measure used, unlike the mutual fund indexes, assumes no reinvestment of income distributed.

period of several years which includes both falling and rising equity prices that one can attempt to evaluate the price performance of common trust funds—and that performance should be measured in terms of their investment goals." [6]

In the case of 181 equity funds, data permitted computation of share-value appreciation and yield over a three-year period. During the first two years of the period, Standard and Poor's 500-Stock Index rose by 23.7 percent, while in the last year it declined by 11.3 percent. Thus, the period may still be too short to provide a good measure of common trust fund performance over the long term. Differences in investment horizons and aversions to risk will result in common trust fund performance below market averages. Only over a longer period would we expect common trust fund performance to match market averages. Where figures for the 3-year period show a lesser appreciation and yield for common trust funds than for market averages, conclusions of poor managerial performance would not be warranted. The differences would be attributable to common trust funds' many conflicting goals—appreciation, liquidity, and income.

The best share-value appreciation among funds valued at the end of October was 24.0 percent. Among funds valued at the end of November, the best appreciation was 21.5 percent, while of those with year-end valuation dates, the best appreciation was 30.2 percent. The median appreciations for funds valued at the end of October, November, and December were 4.5 percent, 6.0 percent, and 7.7 percent, respectively. By comparison, Standard and Poor's Stock Index appreciated by 8.4 percent from October 31, 1963 to October 31, 1966, 9.9 percent from November 30, 1963 to November 30, 1966, and 7.1 percent from the end of 1963 to the end of 1966.

A number of funds showed appreciations in share values which surpassed average gains in Standard and Poor's 500-Stock Index over comparable periods. Of the 98 equity funds valued at the end of October, 25 had appreciations greater than the Standard and Poor's Index change. Of the 50 funds with valuation dates on November 31, 15 equalled or surpassed the Standard and Poor's change of 9.9 percent. And, of the 33 funds valued at year-end, 21 equalled or surpassed the Standard and Poor's change of 7.1 percent. The median appreciations of October-and November-valued funds were below Standard and Poor's Index changes, but differences were smaller when Standard and Poor's changes were smaller. December-valued funds appreciated more than Standard and Poor's.

Yield was computed in two different ways: (1) as a percentage of the initial share value, and (2) as a percentage of the average of the initial and final share values. The best income yields reported over the three-year period by equity funds were 17.0 percent and 14.7 percent, by the original and average-of-two-years' methods, respectively. These far surpass Standard and Poor's average yields on 500 Stocks of 9.4 percent for a comparable period. The median yields of equity funds were 10.2 percent by the original-year method, and 9.8 percent by the more conservative method.

Standard and Poor's appreciation (as of the three valuation dates) plus the yield on stocks, totaled 17.7 percent, 19.2 percent, and 16.5 percent, respectively. The medians for total performance of October-and November-valued equity funds over the same period were slightly lower, at 14.4 percent and 16.5 percent, but December-valued funds surpassed the market average change, totaling 17.1 percent. The differences for October-and

[6] Stanley Silverberg, "Growth and Performance of Common Trust Funds in 1964," *The National Banking Review*, 2, March 1965, pp. 369-370.

November-valued funds are small enough to be explained by broker's fees and other costs.

The performances of some of the equity funds were outstanding, considering the predominance of rising stock prices during the three-year period, the traditional conservatism of common trust funds (necessitated by liquidity considerations and, often, by the terms of the trust agreement), the technical impossibility of keeping funds invested at all times, and other problems in the comparisons. The performance figures reflect the importance attached to income yield and liquidity, along with appreciation.

C. Longer-Term Performance by Size of Bank and Fund

Any attempt to assess longer-term performance by size of bank and size of fund encounters the problem of an insufficient number of observations. Since, of the three groups, those with October valuation dates were the most numerous, these were the only ones examined this way.

As in the single-year analyses, three-year figures showed no simple, straightforward relationship between performance, size of fund, and size of bank. While for smaller funds, medians of performance figures increased with size of bank, variation within cells was considerable, and in nearly every class there were some that exceeded the medians of any other class. Only from median-performance figures of the very small banks was there a strong suggestion that larger funds performed better than smaller funds, though, again, the variation within cells was too great to permit firm conclusions.

D. Balanced and Equity Funds Compared

Since performance data were available for balanced funds, they were compared with equity funds. On the average, balanced or diversified funds were 56 percent invested in common stock and 20 percent in corporate and foreign bonds. Average account participation was considerably higher than for equity funds. The goals of the two types of common trust funds were, of course, considerably different, the balanced funds placing greater emphasis on an assured income return and less on capital appreciation. Their defensive character proved advantageous in 1966, and balanced funds of all valuation dates outperformed equity funds and, hence, the benchmark market indexes. For balanced funds, not only were medians superior, but the overall range was smaller. The standard deviations of performance for balanced funds were also smaller. Fewer balanced funds exhibited performances greatly below market averages, and, though extremes at the other end were not as great (Table 11), more balanced funds exceeded market averages by wide margins.

Statistical Appendix

TABLE 1

Common Trust Fund Growth *

Year	Number of banks	Number of funds	Number of account participations	Total assets (Millions of dollars)	Average fund size (Thousands of dollars)	Average account participation (Thousands of dollars)
1955	174	222	87,000	1,868.7	8,417.6	21.5
1960	327	421	126,000	2,812.6	6,608.8	22.3
1962	343	564	165,000	3,577.7	6,343.4	21.7
1963	391	693	191,300	4,539.8	6,550.9	23.7
1964	418	784	227,500	5,819.7	7,423.1	25.6
1965	464	1,016	271,200	7,529.1	7,410.5	27.8
1966	497	1,089	295,325	7,612.0	6,989.9	25.8

* Total asset figures are for the last valuation date of the year—generally October 31, November 30, or December 31. Common trust funds not having a valuation date during a year are not included until the following year. In subsequent tables, all figures used will be on the same basis, that is, as of the last valuation date during the calendar year for each common trust fund.

Source: Figures for 1955, 1960, and 1962 are from the **Federal Reserve Bulletin,** June 1963, May 1961, and May 1957.

TABLE 2

Percentage Distribution of Assets, by Type of Common Trust Fund, 1966 and 1965

Asset	Equity		Diversified		Fixed income		Tax exempt	
	1966	1965	1966	1965	1966	1965	1966	1965
Cash	1.1	0.9	0.7	0.6	1.0	1.8	1.0	0.8
U.S. Government securities:								
Under one year	1.8	1.3	1.2	1.2	1.1	1.3	a	–
All other	0.4	0.2	12.0	12.0	12.4	13.5	0.3	–
Tax-exempt securities	–	–	0.6	0.1	0.8	0.9	98.4	99.1
Corporate and foreign bonds	0.9	0.7	20.3	19.8	57.4	58.2	–	–
Private placements	0.1	–	3.1	2.3	15.1	11.9	a	–
Mortgages	0.1	0.2	2.1	1.8	7.9	7.2	0.1	–
Preferred stock	0.6	0.3	3.7	4.5	3.3	4.0	–	–
Common stock	94.1	95.8	56.0	57.4	0.1	0.6	0.1	–
Bank and financial	7.8	7.6	4.9	4.9	a	0.1	a	–
Utilities	17.3	17.6	12.2	12.4	a	0.1	a	–
All other	69.0	70.6	38.9	40.1	a	0.4	0.1	–
Other assets	0.9	0.6	0.3	0.2	0.8	0.6	0.1	–
Total assets *	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total assets (millions of dollars)	1,499	1,539	2,984	3,211	1,769	1,664	1,361	1,115
Number of funds	345	307	315	324	306	288	123	97
Number of account participations	77,105	64,604	110,138	106,569	84,930	81,392	23,152	18,639

a. Less than 0.05.

* Figures may not add to totals shown because of rounding.

Source: Data for tables 2-11 were derived from surveys of banks and trust companies operating common trust funds.

TABLE 3

Distribution of Common Trust Funds, by Type and Size of Funds, 1966

Size of fund (Total holdings, millions of dollars)	All funds (Number)	Equity (Percent)	Fixed income (Percent)	Diversified (Percent)	Tax exempt (Percent)
Under 1	340	41.7	27.8	27.5	20.2
1 – 2	201	18.7	20.1	17.3	17.0
2 – 5	215	17.5	25.6	16.3	20.2
5 – 10	146	12.0	11.3	15.3	17.7
10 – 25	127	8.4	11.3	15.0	13.0
25 – 50	40	0.9	3.2	5.1	8.9
50 and over	20	0.9	0.6	3.5	3.2
All funds, 1966	1,089	100.0	100.0	100.0	100.0

TABLE 4

Asset Distribution of Common Trust Funds, 1966 and 1965 *

Asset	1966		1965	
	Amount (Millions of dollars)	Percent of total	Amount (Millions of dollars)	Percent of total
Cash	71.5	0.9	71.9	1.0
U.S. Government and agency securities				
Under one year	83.5	1.1	77.9	1.0
All other	590.0	7.8	614.1	8.2
Tax-exempt securities	1,355.6	17.8	1,123.3	14.9
Corporate and foreign bonds	1,636.5	21.5	1,614.5	21.4
Private placements	365.6	4.8	272.2	3.6
Mortgages	207.9	2.7	181.0	2.4
Preferred stock	178.4	2.3	217.0	2.9
Common stock	3,084.4	40.5	3,328.6	44.2
Bank and finance	263.1	3.5	274.4	3.6
Utilities	624.8	8.2	672.2	8.9
All other	2,196.6	28.8	2,382.0	31.6
Other assets	38.7	0.5	28.5	0.4
Total assets	7,612.0	100.0	7,529.1	100.0

* Market values of assets are for the last valuation date in 1966 and the same date in 1965. U. S. Government securities include obligations of the U. S. Treasury and of various government corporations, but not the mortgages insured by the FHA or the VA. The latter are included under mortgages. Tax-exempt securities include all direct and indirect obligations of state and local government authorities, including various revenue bonds and public housing authority notes. Corporate and foreign bonds includes bonds of the International Bank. Directly placed corporate notes and amortized loans other than mortgages are included under private placements. Under common stock, bank and finance, are included bank holding companies, insurance companies, and all other corporations primarily in the financial area (for example, stock of commercial credit corporation is included in this category). American Telephone and Telegraph Corporation is included under utilities, along with the stock of gas and electric companies. All other common stock includes all industry categories (including railroads, mining, manufacturing, retailing, and the like), not covered in the other two categories. The category, other assets, includes items like real estate or mineral rights, certificates of deposit, and savings and loan shares. Definitions in the 1965 and 1966 surveys are identical.

TABLE 5

Common Trust Funds, by Size of Bank, 1966

Size of bank (Millions of dollars) *	Number of insured banks (1965) †	Number of banks with funds	Number of funds	Number of participations	Total assets of funds (Millions of dollars)	Average size of funds (Thousands of dollars)	Average size of participation (Thousands of dollars)
Less than 99.9	12,974	218	353	45,155	$ 775.4	$ 2,196.5	$17.1
100 to 499.9	302	181	400	92,443	1,762.8	4,407.0	19.0
500 to 999.9)		51	158	55,061	1,538.8	9,739.1	27.9
)	90						
)							
Over 1,000.0)		38	156	91,574	3,131.5	20,073.7	34.2
Trust companies	50	9	22	11,092	403.3	18,331.8	36.3
Total	13,416	497	1,089	295,325	$7,612.0	$ 6,989.9	$25.8

* Size of bank is represented by total assets reported in the June 1966 call reports.
† United States (states and other areas). Year-end 1965 data were used because of the unavailability of 1966 data by bank-size.

TABLE 6

Common Trust Funds, by States, 1964, 1965 and 1966

State, with year of legislation of common trust funds	Number of banks Dec. 31, 1966	Number of banks with common trust funds			Number of common trust funds			Number of account participations			Total assets of funds (Millions of dollars)		
		1964	1965	1966	1964	1965	1966	1964	1965	1966	1964	1965	1966
Alabama (1943)	267	5	6	6	6	10	10	1,373	1,504	1,841	$ 15.8	$ 18.1	$ 19.3
Alaska (1964)	14	0	0	1	0	0	1	0	0	45	0	0	0.4
Arizona (1941)	18	5	5	4	11	11	13	1,889	2,145	2,606	50.8	66.1	71.2
Arkansas (1947)	246	3	3	3	3	4	4	675	791	985	7.8	9.6	10.2
California (1947)	193	11	11	11	27	40	35	17,693	21,923	24,042	375.3	511.4	521.2
Colorado (1947)	252	11	13	13	22	25	25	5,315	5,892	6,325	134.7	157.6	166.2
Connecticut (1943)	137	10	10	12	15	20	26	4,070	4,910	5,990	126.1	177.8	169.3
Delaware (1935)	22	3	3	3	4	7	10	2,200	2,733	3,381	85.0	75.2	91.7
District of Columbia (1949)	14	4	4	4	6	7	7	2,227	2,532	2,736	68.5	83.5	84.5
Florida (1941)	447	15	17	17	24	33	31	2,715	3,327	3,916	52.5	70.9	73.4
Georgia (1943)	426	6	8	8	12	19	19	4,277	4,786	4,967	92.1	115.1	106.5
Hawaii (1947)	11	3	3	3	7	7	7	1,063	1,214	1,429	19.6	22.6	22.9
Idaho (1949)	25	1	1	3	1	2	5	71	214	339	.7	2.3	3.5
Illinois (1943)	1,061	10	12	13	26	30	32	6,832	8,154	9,449	274.9	366.7	404.8
Indiana (1937)	423	9	11	13	9	27	26	1,676	2,967	3,881	29.3	80.4	67.2
Iowa (1961)	674	2	2	2	2	4	4	170	432	627	1.6	12.2	15.8
Kansas (1951)	601	3	3	4	6	7	8	375	451	589	6.2	8.8	9.5
Kentucky (1938)	348	6	7	7	8	9	12	1,906	2,350	2,514	28.8	43.6	43.0
Louisiana (1950)	220	1	1	2	1	1	2	171	191	275	2.7	3.4	3.7
Maine (1951)	76	6	7	7	12	16	17	2,209	2,082	2,342	51.3	61.1	61.8
Maryland (1945)	128	6	6	6	14	16	14	5,843	6,348	6,345	132.3	171.3	167.2
Massachusetts (1941)	340	19	22	23	36	43	46	10,877	11,974	12,842	435.3	495.0	475.5
Michigan (1941)	347	13	13	14	26	40	43	4,901	7,728	9,060	96.0	188.8	231.7
Minnesota (1937)	724	8	8	9	20	22	23	3,902	6,200	5,716	69.3	104.5	97.3
Mississippi (1950)	190	2	2	2	2	4	5	527	686	1,090	6.8	11.5	11.6
Missouri (1940) (a)	661	9	8	10	21	25	25	8,815	9,922	10,512	225.2	295.2	275.6
Montana (1955)	132	2	2	3	4	4	5	426	514	614	4.9	6.0	6.4
Nebraska (1953)	439	3	3	4	5	5	7	858	1,097	1,490	20.1	25.2	29.8
Nevada (1955)	9	1	1	1	2	3	3	297	385	471	5.1	6.6	7.1
New Hampshire (1953)	107	4	4	4	6	6	6	297	312	314	10.4	11.1	10.2
New Jersey (1945)	253	13	14	17	25	29	36	7,052	6,036	6,981	87.8	106.1	109.6
New Mexico (1955)	64	2	2	2	3	6	6	795	1,016	1,192	13.5	18.8	21.1
New York (1937)	462	23	25	24	73	81	79	24,351	26,541	28,009	1,152.4	1,414.8	1,416.3
North Carolina (1939)	137	9	10	10	15	19	21	6,663	6,573	8,960	129.7	144.2	165.4
North Dakota (1955)	167	1	3	3	3	6	6	255	409	563	2.2	4.1	3.4
Ohio (1943)	538	22	25	25	43	70	66	7,300	9,906	10,232	207.5	314.1	280.7
Oklahoma (1949)	420	4	6	6	10	16	16	838	1,086	1,465	21.2	27.1	29.8
Oregon (1951)	53	4	4	4	10	12	12	3,956	4,705	4,949	74.2	91.3	85.2
Pennsylvania (1939)	553	63	70	75	105	130	140	53,114	59,861	63,680	1,154.2	1,422.3	1,425.4
Rhode Island (1956)	18	3	3	3	8	10	10	1,361	1,681	1,924	35.1	42.4	45.4
South Carolina (1955)	128	3	3	2	7	6	4	1,551	1,752	1,589	17.7	21.4	14.5
South Dakota (1941)	167	5	5	5	9	9	9	529	622	705	4.4	5.8	6.5
Tennessee (1953)	298	9	10	10	12	14	15	2,069	2,397	2,614	38.4	46.9	48.5
Texas (1947)	1,147	22	26	31	30	49	61	5,114	6,893	8,566	107.9	242.8	238.2
Utah (1951)	55	3	4	5	5	7	10	1,160	1,354	2,367	9.8	13.6	25.0
Vermont (1933)	54	6	7	7	9	9	12	625	6,820	863	7.2	7.7	8.6
Virginia (1944)	251	21	21	23	37	40	45	6,751	7,305	8,315	140.7	173.4	180.3
Washington (1943)	100	5	7	7	12	17	24	4,268	5,111	6,273	84.9	109.6	119.7
West Virginia (1945)	190	7	8	9	7	9	10	865	1,178	1,100	11.7	15.8	14.1
Wisconsin (1943)	594	12	15	17	23	30	36	5,080	6,191	8,245	88.2	106.3	115.9
Wyoming (1955)	69	0	0	0	0	0	0	0	0	0	0	0	0
Total U. S.	14,291	418	464	497	784	1,016	1,089	227,500	271,230	295,325	5,819.7	7,529.1	7,612.0

(a) By court decision; legislation was enacted in 1955.

TABLE 7

Median Percentage Changes in Unit or Share Values and Yield of Equity Funds, Compared with Changes in Standard and Poor's Composite Stock Index and Dividend Yields, 1963, 1964 and 1966

Item and valuation date	Number of funds			Median change during 12-month period ending in*			Median yields for 12-month period (Percent) *		
	1963	1964	1966	1963	1964	1966	1963	1964	1966
Equity common trust funds:									
October 31	52	87	164	25.7 (6.2) (38.2)	12.7 (6.2) (19.5)	–11.7 (–24.7) (+5.5)	3.7	((((	3.1 (0.4) (6.9)
November 30	15	56	74	14.2 (8.1) (20.3)	13.6 (7.1) (20.1)	–11.9 (–17.9) (– 3.8)	3.5	(3.22 ((1.87) ((4.26)	3.1 (0.8) (4.2)
December 31	15	29	60	17.8 (14.9) (26.9)	11.5 (7.7) (20.4)	–10.9 (–17.3) (– 6.2)	3.0	(((	2.9 (0.3) (6.6)
Standard and Poor's Composite (500-Stock) Index and Dividend Yield									
October 31	–	–	–	30.9	14.7	–13.2	3.22	3.0	3.3
November 30	–	–	–	17.6	15.3	–12.2	3.19	3.0	3.4
December 31	–	–	–	19.2	13.0	–13.1	3.17	3.0	3.4

* Highest and lowest changes and yields for common trust funds are shown in parentheses. Data presented in **The National Banking Review**, June 1966, for 1965 were for all valuation dates combined. The differences from market averages were approximately of the order of those of 1964. Thus, median appreciation of 240 equity funds was 6.8 percent, compared with Standard and Poor's appreciation of 8.8 percent.

TABLE 8

Median Percentage Change in Unit Share Value of Equity Funds, by Bank Size and Fund Size, 1966 *

Bank size (Millions of dollars of assets)	Size of fund (millions of dollars) and median percent appreciation						
	Under 1	1 - 2	2 - 5	5 - 10	10 - 25	All banks	Number of funds
Less than 100	88.4	88.6	87.2	89.3	91.0	88.4	95
100 and under 500	88.6	87.2	88.1	89.2	89.8	88.5	116
500 and under 1,000	90.4	88.1	89.5	88.5	87.3	89.2	41
1,000 and over	87.8	89.4	88.5	88.0	87.7	88.3	36
All banks	88.5	88.3	88.3	88.7	89.3	88.4 †	–
Number of funds	106	58	55	42	27	–	288

* Unit or share value on valuation date in 1966 divided by unit or share value 12-months earlier, expressed as percentage.
† For 298 funds; includes performance data for large funds which have been withheld because of disclosure problems.

TABLE 9

Median Total Performance of Equity Funds, by Bank Size and Fund Size, 1966 *

Bank size (Millions of dollars of assets)	Size of fund (millions of dollars) and median total performance (Percent)						
	Under 1	1 - 2	2 - 5	5 - 10	10 - 25	All banks	Number of funds
Less than 100	91.7	91.9	90.2	92.5	93.8	91.6	95
100 and under 500	91.7	90.3	91.2	92.5	92.7	91.8	116
500 and under 1,000	93.1	90.5	92.5	91.8	90.0	92.4	41
1,000 and over	91.0	92.0	92.0	91.2	90.8	91.8	36
All banks	91.7	91.2	91.7	92.2	91.8	91.5 †	–
Number of funds	106	58	55	42	27	–	288

* $\left(\frac{\text{Unit Value 1966}}{\text{Unit Value 1965}} \times 100\right)$ + interest return for 12-month period.

† For 298 funds; includes performance data for larger funds which have been withheld because of disclosure problems.

TABLE 10

Median Total Performance of Equity Funds with October Valuation Dates, by Bank Size and Fund Size, 1966 *

Bank size (Millions of dollars of assets)	Common trust fund size (millions of dollars)			
	Under 1	1 and under 2	2 and under 10	All banks in sample
Less than $100	90.7 (n=32)	92.7 (n=10)	91.9 (n=7)	91.8 (n=49)
100 and under 500	92.9 (n=19)	90.3 (n=16)	91.7 (n=31)	91.9 (n=66)
500 and over	92.7 (n=5)	90.9 (n=6)	91.2 (n=30)	91.2 (n=41)
All banks in sample	91.9 (n=56)	90.9 (n=32)	91.6 (n=68)	91.4 (n=156)

* Number of items shown in parentheses.

TABLE 11

Median Total Performance of Equity and Balanced Funds, 1966

Valuation date	Total performance *		Number of funds	
	Equity funds (Percent)	Balanced funds (Percent)	Equity funds	Balanced funds
October 31	91.5 (78.7, 109.7)	93.8 (83.5, 104.5)	164	184
November 30	91.2 (85.7, 98.7)	94.0 (87.7, 104.1)	74	72
December 31	92.5 (83.0, 97.4)	94.2 (89.1, 103.2)	60	35
All valuation dates	91.5 (78.7, 109.7)	93.9 (83.5, 104.5)	298	291

* Extreme values are shown in parentheses. Medians are based on total performance of each fund and are not the sum of the median of the asset appreciation figure and the median of yield figures.

►FREDERICK W. BELL and NEIL B. MURPHY

Bank Service Charges and Costs

In a recent article in this *Review*, Olin S. Pugh and Oliver G. Wood, Jr. reported the results of a survey of bank service charges which revealed considerable variation in these charges among Southern banks.[1] The authors assert: "Perhaps a primary reason for such diversity is that many banks lack data on the total cost of providing and servicing checking accounts."[2] The purpose of this article is to test the hypothesis that banks in the Federal Reserve System's functional cost program formulate their pricing policies on the basis of estimated costs.[3]

Our analysis shows that:

1. The dispersion in service charges for a sample of functional-cost banks in the first Federal Reserve district can be "explained" largely on the basis of cost factors. However, a one dollar increase in marginal direct cost of processing a demand deposit account is accompanied by only a 32 cent increase in service charges.

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[1] Olin S. Pugh and Oliver G. Wood, Jr., "Bank Service Charges in the South," *The National Banking Review*, 4, December 1966, pp. 175-181.

[2] *Ibid.*, p. 181.

[3] At the time of the Pugh-Wood study, no Southern banks were in the functional cost program.

Thus, service charges respond inelastically to increases in costs.

2. Throughout the range of observations, income from service charges is below the processing cost per demand deposit account.

3. Net earnings from invested demand-deposit balances per account (after subtraction of loan costs) are, on the average, approximately three times greater than service-charge income. This finding may explain the insensitivity of service charges to marginal direct cost.

4. When branch systems are compared to unit banks with the same direct marginal cost, generally higher service charges are observed, presumably because of greater occupancy expenses (rental and depreciation on buildings) which are not considered direct processing costs. This may be compared with similar findings by Shull and Horvitz, and by Kohn, who observed that service charges increased for a unit bank after it was acquired by a branch system.[4]

I. The Demand Deposit Cost Function

The typical commercial bank is a multi-product firm engaged in servicing demand and time deposits, processing business, instalment, and real estate loan accounts, and providing other services. We treat the demand deposit service as an individual product of the banking firm. The basic unit of output for the demand deposit function will be defined as the demand deposit account.[5] However, the activity, size, and composition of accounts may vary among banks. These variables will be added to the cost equation below in order to make the account a more homogeneous unit of output. **(All variables in this article are on an annual basis.)**

The demand deposit cost function may be derived from a Cobb-Douglas production function under the assumption of cost minimization: [6]

$$TDC = AN^{\alpha} A_R^{\beta} WIN^{\rho} [R/(R+S)]^{\delta} W^{\psi} B_1^{\gamma_1} B_2^{\gamma_2} B_3^{\gamma_3} B_4^{\gamma_4} B_5^{\gamma_5} \quad (1)$$

where: TDC = total direct cost of processing demand deposit accounts;

N = number of demand deposit accounts (a mixture of regular and special accounts);

A_R = average size (or balance) per regular account;

WIN = weighted items per account:

		Weight[7]
checks processed:	X_1	1.0000
deposits:	X_2	.9475
transit items:	X_3	.1660

[R/(R+S)] = ratio of regular to total checking accounts (R+S);

W = average annual wage rate per employee (including officers);

B_1 = 10 for banks with one branch, 1 for other banks;

B_2 = 10 for banks with two branches, 1 for other banks;

B_3 = 10 for banks with three branches, 1 for other banks;

B_4 = 10 for banks with four branches, 1 for other banks;

B_5 = 10 for banks with five or more branches, 1 for other banks.

Equation 1 may be differentiated with

[4] Bernard Shull and Paul M. Horvitz, "Branch Banking and the Structure of Competition," *The National Banking Review*, 1, March 1964, pp. 301-341; Ernest Kohn, *Branch Banking, Bank Mergers and the Public Interest*, New York State Banking Department, January 1964.

[5] This definition was used in George J. Benston, "Economies of Scale and Marginal Costs in Banking Operations," *The National Banking Review*, 2, June 1965, pp. 507-549.

[6] Frederick W. Bell and Neil B. Murphy, *Returns to Scale in Commercial Banking*, Report to the Federal Reserve Bank of Boston, forthcoming, October 1967.

[7] Benston, *op. cit.*, p. 515.

respect to the number of accounts to obtain the marginal direct cost of processing a demand deposit account:

$$\frac{\partial TDC}{\partial N} = MDC = \alpha AN^{\alpha-1} A_R^{\beta} WIN^{\gamma} [R/(R+S)]^{\delta} W^{\psi} B_1^{\gamma_1} B_2^{\gamma_2} B_3^{\gamma_3} B_4^{\lambda_4} B_5^{\lambda_5}. \quad (2)$$

MDC does not include costs for overall administration, business development, or occupancy.[8]

Data on the above variables were obtained from 92 New England banks in the functional cost program. These banks were selected because a prior survey yielded detailed information on service-charge rates. As in the procedure followed by Benston, equation 1 was converted to logarithms and estimated by least-squares. The results are shown in Table 1. All the variables except $B_1 - B_4$ were statistically significant at the 5 percent level. The 92 banks exhibited strong economies of scale, that is, the parameter on the number of accounts variable is statistically less than unity at the one percent level.

II. The Marginal Direct Cost for a "Typical" Regular Account

We may derive the marginal direct cost function for a "typical" regular account by assigning fixed representative values to A_R and WIN. The geometric means of these variables were selected as the most representative of the typical account:

Annual home debits (X_1)	289.8
Annual deposits (X_2)	43.5
Annual transit items (X_3)	262.9
Average balance per regular account	$2,528

Because the number of demand deposit accounts is a composite of regular and special accounts, the ratio of regular to total accounts was inserted in equation 1 to hold constant any variation among banks. If we set the ratio equal to unity, the cost function will refer only to regular accounts. The final marginal direct cost function for a typical regular account is shown in Table 1. Observe that there are three basic factors which affect marginal cost for the typical account: (1) the scale of operations; (2) the wage rate; (3) branching structure.

III. Low-Cost Versus High-Cost Banks

For the 92 banks represented in the regression analysis, the average marginal direct cost per regular account was $36.50.[9] The sample banks were divided into low- and high-cost banks on the basis of the average marginal cost for the group. The high-cost banks were smaller than the low-cost banks, had higher wage rates, averaged a larger number of branches, and showed direct marginal cost per account of $4.06 higher than low-cost banks.[10] As indicated in Table 2, scale of operations, wage rates, and branching contributed $.32, $1.74, and $2.00, respectively, to the total difference between groups.

IV. Service Charges and Cost Factors

Service charges are quoted in various ways by different banks. Let S_c refer to the annual price (that is, net revenue per account) the user must pay for his regular demand deposit account. It is a function of a number of variables:

$$S_c = M + p_1X_1 + p_2X_2 + p_3X_3 - r_e[A_R(1-F)], \quad (3)$$

where M = annual maintenance charge; p_1, p_2, and p_3 = prices charged for checks processed, deposits, and transit items,

[8] In the Federal Reserve System's functional cost program, all direct expenses are allocated to each bank function. However, some expenses such as occupancy are not allocated but placed in an indirect function.

[9] The geometric mean was used to establish an average cost for the 92 banks since we specified a log-linear cost function.

[10] In computing the difference in marginal cost between groups, the regression equation was used to calculate the "estimated" costs.

TABLE 1

Cost Equations for the Demand Deposit Function, 92 Commercial Banks in New England, 1965

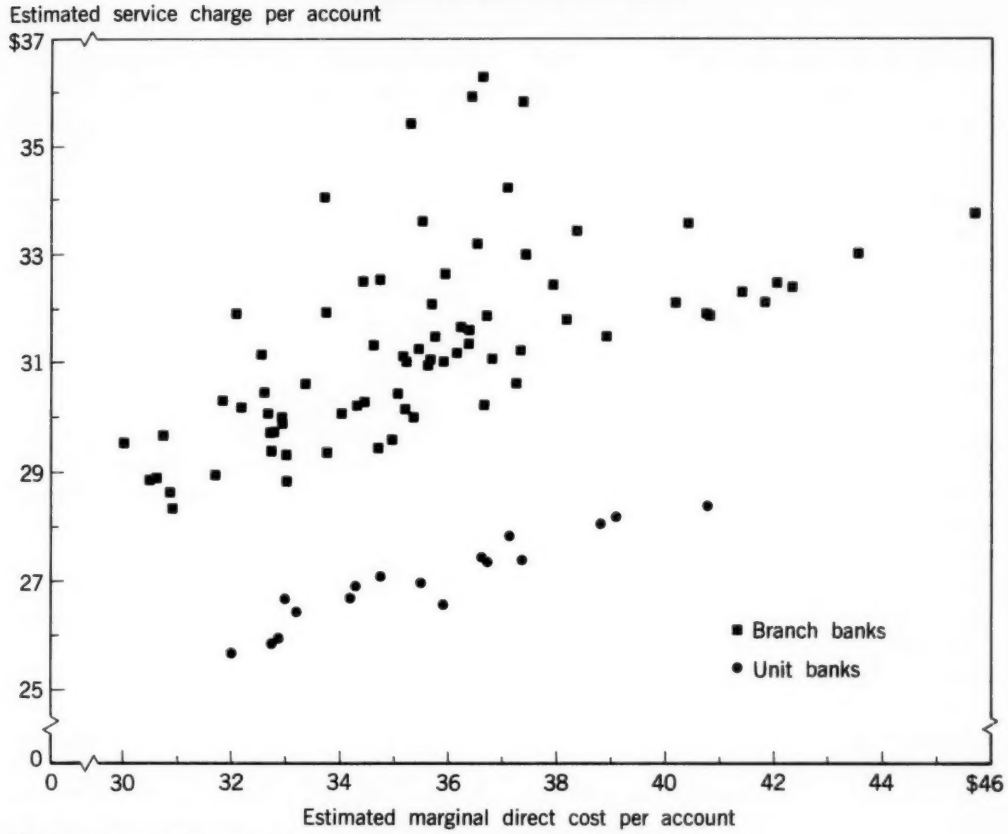
Variable	Total direct cost equation	Marginal direct cost equation	Marginal direct cost equation for a typical regular account*
N	.8768 (.0397) 22.0738	–.1232	–.1232
A_R	.5084 (.0787) 6.4542	.5084	
WIN	.3152 (.1438) 2.1908	.3152	
R/(R+S)	.3631 (.0839) 4.3266	.3631	
W	.3911 (.1264) 3.0941	.3911	.3911
B_1	.0042 (.0232) .1818	.0042	.0042
B_2	.0378 (.0291) 1.2982	.0378	.0378
B_3	.0270 (.0337) .8018	.0270	.0270
B_4	.0657 (.0400) 1.6419	.0657	.0657
B_5	.1240 (.0376) 3.2976	.1240	.1240
Constant	–2.6632	–2.6062	.6042
R^2	.9789		

*Average balance = $2528
R/(R+S) = 1.0
Home debits = 289.8
Deposits = 43.5
Transit items = 262.9

respectively; r_e = rate of earnings allowances on balances; F = percent float; while X_1, X_2, and X_3 and A_R are as defined above. The actual service-charge revenue for the individual bank will vary, depending on all the factors expressed in equation 3. As in the cost function, we must hold the characteristics of the account constant by including A_R and WIN in the following function ex-

The Relation of Service Charges to Marginal Direct Cost for a Typical Regular Demand Deposit Account,* 1965

(92 Commercial Banks in New England)



*Activity and average balance held constant for both service charges and marginal cost. Assumptions per account: Home debits=289.8; Deposits=43.5; Transit items=262.9; Average balance=$2528.

TABLE 2

Impact of Scale, Wage Levels, and Branching Structure on Marginal Direct Cost per Typical Regular Demand Deposit Account,* 92 Commercial Banks in New England, 1965

Cost factor	Low-cost banks [2]	High-cost banks [3]	Increase in cost per account
Scale of operations (Number of accounts)	7052	6541	$ .32
Annual wage per employee [1]	$4273	$4848	1.74
Number of branches	4.08	4.53	2.00
Estimated marginal direct cost per account	$33.33	$37.39	$4.06

*Average balance = $2528
R/(R+S) = 1.0
Home debits = 289.8
Deposits = 43.5
Transit items = 262.9

[1] Includes officers.
[2] All banks below geometric mean of marginal direct cost per account (49 banks).
[3] All banks above geometric mean of marginal direct cost per account (43 banks).

plaining variations in S_c: [11]

$$S_c = KN^{\alpha'} A_R^{\beta'} WIN^{\rho'} W^{\varepsilon'} B_1^{\gamma 1'} B_2^{\gamma 2'} B_3^{\gamma 3'} B_4^{\gamma 4'} B_5^{\gamma 5'} \quad (4)$$

Therefore, service charges, S_c, are a function of the kind of account—activity and size as expressed in equation 3—and the three cost factors: (1) scale of operations; (2) the wage rate; and (3) branching structure.[12] Variations in M, p_1, p_2, p_3, and r_e will be the result of these three cost factors since we are holding constant X_1, X_2, X_3, and A_R.[13] M, p_1, p_2, p_3, and r_e represent a price-configuration which may be varied by the individual bank to influence revenue per account.

In the Pugh and Wood study, fixed values were assigned to X_1, X_2, X_3, and A_R to establish a typical account.[14] Our procedure is different since we use a regression equation to control account characteristics, and also to assess the individual impact of various cost factors on the service-charge price configuration.

Equation 4 was estimated using least-squares. The results are shown in Table 3. WIN, B_1, B_2, and B_4 were statistically significant at the 5 percent level. The parameter on the number of accounts was negative, as expected, since a larger scale of operations produces lower cost. In order to obtain the service-charge function for a typical regular account, A_R and WIN were assigned the same values that were used in obtaining a typical regular account cost function (see Table 3).

[11] S_c already refers to charges on regular accounts and is not a mixture of regular and special accounts. Therefore, R/(R+S) was not included in equation 4.

[12] To escape from the "identification problem," we shall assume that demand (N) is exogenous to the banking firm. For justification, see L. A. Stiles, *Businesses View Banking Services: A Survey of Cedar Rapids, Iowa*, Chicago: Federal Reserve Bank of Chicago, 1967, p. 25.

[13] Percentage allowance for float does not vary appreciably within the sample of banks.

[14] Pugh and Wood, *op. cit.*

V. *Estimated Marginal Direct Cost and Estimated Service Charges for the Typical Regular Account*

For each bank in our sample, values of the three cost factors (scale, wage rate, and branching structure) were inserted in the marginal-direct-cost-function for a typical account, and the estimated marginal cost was computed. The same values were inserted in the service-charge function for a typical regular account, and the estimated service charge was then calculated.[15] These results were then plotted in the scatter diagram. They indicate that estimated service charges are closely related to estimated marginal direct cost. Hence, higher marginal cost produces higher service charges for the typical regular account. Notice that all the unit banks have lower service charges than do branch systems with identical direct marginal cost.

The following regression function was estimated, using the data in the scatter diagram:

$$[S_c]_e = a + b[MDC]_e + cB, \quad (5)$$

where $[S_c]_e$ and $[MDC]_e$ are estimated service charges and marginal direct cost, respectively, for a typical regular account, while B = 0 for a unit bank and 1 for a branch system. The results are the following:

$$[S_c]_e = \underset{}{15.75} + \underset{(.044)\ 7.20}{.32[MDC]_e} + \underset{(.352)\ 12.33}{4.33\ B}$$

$$R^2 = .70. \quad (5')$$

It is apparent that a one dollar increase in $[MDC]_e$ results in but a 32 cent in-

[15] Calculated parameters were used for the three cost factors on both the marginal-cost and service-charge equations irrespective of their statistical-significance level. This procedure was used in order to allow for operation of all three cost factors on both the service-charge and marginal-cost sides. The signs of the parameters were consistent, although their statistical significance varied.

TABLE 3

Service Charge Equations for the Regular Demand Deposit Function, 92 Commercial Banks in New England, 1965

Variable	Service charge per account equation	Service charge per account equation for the typical regular account *
N	−.0331 (.0525) −.6307	−.0331
A_R	.1245 (.0744) 1.6735	
WIN	.7045 (.1567) 4.4959	
W	.2196 (.1662) 1.3215	.2196
B_1	.0601 (.0307) 1.9563	.0601
B_2	.0956 (.0385) 2.4840	.0956
B_3	.0495 (.0442) 1.1199	.0495
B_4	.1386 (.0526) 2.6328	.1386
B_5	.0881 (.0495) 1.7769	.0881
Constant	−1.4930	.7438
R^2	.5859	

*Average balance = $2528
Home debits = 289.8
Deposits = 43.5
Transit items = 262.9

crease in service charges.[16] Hence, high-cost banks do not seek to cover total increases in marginal direct cost; they respond inelastically to direct cost pressure. It is also quite noticeable that $[MDC]_e$ always exceeds service-charge income throughout the range of observations. Therefore, banks do not attempt to recover through service charges the full cost of processing. This is understandable since earnings may be obtained on invested balances to augment total revenue.

Finally, branch systems charge, on the average, $4.33 more per account than do unit banks for the identical direct mar-

[16] The relation between estimated service charges and cost was also estimated as a log-linear function. The results indicated that a 10 percent increase in marginal cost was accompanied by a 4 percent increase in service charges. Thus, the response of service charges to the cost factors is very inelastic.

TABLE 4

Average earnings on loanable balances

Book balance of all funds deposited		
By customer		$2,538
Less float (8.7 percent)		221
Collected balances		$2,317
Less required reserves (12.0 percent)	$278	
and excess reserves (1.9 percent)[1]	6	284
Loanable balances		$2,033
Total portfolio income from loanable		
Balances based on earnings of 5.5 percent per year		$112
Less total cost of processing loans and security investments[2]		22
Net earnings per account		$ 90

[1] Excess reserves as a percent of gross required reserves.

[2] Includes direct cost and indirect cost for real estate loans, instalment loans, business loans, and security investments. Indirect cost includes business development, administration and occupancy expenses, and was allocated on the basis of the number of employees in the loan and security functions as a percent of total employees.

ginal cost. This may be explained in the following manner. Occupancy cost is not allocated to the demand-deposit function (or any other direct function); therefore, it is not included in direct marginal cost. Elsewhere, we have shown by separate analysis that occupancy costs are considerably higher for branch systems.[17] This is not totally unexpected since branch systems must duplicate facilities which are consolidated in unit banks. Therefore, when indirect costs are added to direct costs for the demand-deposit function, overall cost and service charges might be higher. This would explain similar findings on service charges by Shull and Horvitz, and by Kohn.[18]

VI. Earnings on Demand Deposit Balances

As indicated in the preceding section, service charges are only one source of revenue for the demand-deposit function. Earnings on balances are also important. Use of functional cost data, along with confidential records for the 92 commercial banks in the sample, indicated that net earnings (after deduction of loan costs) on loanable balances for the typical account are approximately three times greater than service-charge income. The typical regular account earns $90.00 after deduction for the costs associated with the loan and securities functions. The computations are shown in Table 4. Thus, we may add $90.00 to service-charge income at all levels of marginal direct cost in the scatter diagram. This is possible since a correlation of percent float, percent actual reserves, and the rate of return both before and after the deduction for cost, with both $[S_c]_e$ and $[MDC]_e$, was not statistically different from zero at the 5 percent level. There is no apparent reason why these variables should be correlated. Hence, $90.00 may be considered a constant to add to our service-charge cost equation. Total earnings greatly exceed MDC.

In light of these relationships, bankers may regard service charges as a secon-

[17] Bell and Murphy, *op. cit.*; Benston, *op. cit.*

[18] Shull and Horvitz, *op. cit.*; Kohn, *op. cit.*

dary component of total revenue per account, and may not increase these charges proportionately as costs rise.

VII. The Implications

We have shown that service charges are related inelastically to cost factors, and we have endeavored to explain this fact on the basis of the importance of service-charge income in total earnings per account. The findings indicate that banks participating in the Federal Reserve System functional cost program do take cost into consideration when pricing demand-deposit services, so that knowledge of these costs and the causes of their variations may be important in improving the efficiency of bank markets.

► JEROME C. DARNELL

Determinants of Chain Banking

The practice of linking commercial banks through some combination of common shareholdings or interlocking directors and officers, usually referred to as chain banking, is more likely to be found in states that prohibit branch banking, in states where group banking is not widespread, and in states having higher personal incomes, higher urbanization ratios, and larger population growth rates. These are the most significant findings to emerge from an analysis of chain banking structure.

Chain banking, one of three alternative forms of achieving concentration of banking resources, is an important organizational arrangement in banking. It furnishes the means by which two or more individually-chartered banks coordinate their operating policies and bring under centralized control a larger aggregation of resources than would normally be achieved by banks operating independently. The other two forms of concentration are branch banking and group banking. The latter involves the control of two or more individually-chartered banks by a bank holding company.

In two recent studies, George G. Kaufman has used multiple regression and correlation analysis to investigate bank market structure and performance [1] and to determine whether the presence of nonbank financial intermediaries—savings and loan associations and mutual

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[1] George G. Kaufman, "Bank Market Structure and Performance: The Evidence From Iowa," *Southern Economic Journal*, April 1966, pp. 429-439.

savings banks—increases the liquid savings of a community.[2] The present study uses the same techniques of analysis on measures of chain banking structure.

An examination of Federal Reserve System member-bank stockholder lists[3] revealed that nearly 20 percent of all member banks may be classified as chain banks, and that these banks held almost 20 percent of all member-bank assets in 1962. A summary analysis of chain banking among member banks was published recently, giving only the descriptive measures of chain banking structure.[4] One of the outstanding characteristics of this structure, as shown in the Appendix, Table 1, is the wide variation among states, and among regions of the country, in the number and proportion of member banks having common ownership ties. A similar geographic pattern of variation, although not as pronounced, is evident when chain banks are considered relative to all insured commercial banks. An even greater variation can be found among states and regions when chain banking structure is viewed in terms of assets controlled. Consideration of the geographic pattern of chain banking, in conjunction with areas where branch banking is permitted or restricted, suggests that multiple-bank ownership does not exist merely as a chance or random phenomenon.

The purpose of this article is to determine why chain banking is widespread in some states and nonexistent in others.

I. Framework for Investigation

In attempting to determine the conditions that account for observed variations among states in multiple-bank ownership, four ratio measures of chain banking structure will be used as dependent variables in the regression models. Primary attention will be directed toward the ratios of chain banks to member banks, and of chain-bank assets to member-bank assets. These two indicators of chain banking structure are used in order to represent the influence of multiple-bank ownership more accurately. If consideration were given only to the number of chain banks within a given area, a misleading impression might emerge because the mere presence of a large *number* of banks linked together would be strong evidence of a reduction in the number of "independent" banking alternatives available to the public. Yet these banks might be very small and control an insignificant share of the area's banking resources. On the other hand, merely a few large banks linked together could exert a much more important influence on the banking community.

Unfortunately, data on chain banks are available only for 1962; thus, the reliability of the regression models cannot be verified by examining data from earlier and subsequent years. As an alternative to a time series for checking the reliability of the estimated regressions, secondary attention will center on regression models using the ratios of chain banks to insured commercial banks, and of chain-bank assets to assets of insured commercial banks, as dependent variables.

Linear cross-section regression equations are estimated for each of the four dependent variables, based upon 51 observations—for all states and the District of Columbia. A total of 12 independent variables are used in deriving the four regressions, although the maximum number appearing in any one regression is nine. By borrowing from the classifica-

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[2] George G. Kaufman and Cynthia M. Latta, "Near Banks and Local Savings," *The National Banking Review*, 3, June 1966, pp. 539-542.

[3] U. S. Congress, House Committee on Banking and Currency, Subcommittee on Domestic Finance, *Twenty Largest Stockholders of Record in Member Banks of the Federal Reserve System*, 88th Congress, 2nd Session, Washington, D. C.: Government Printing Office, 1964.

[4] Jerome C. Darnell, "Chain Banking," *The National Banking Review*, 3, March 1966, pp. 307-331.

tion scheme used by Kaufman,[5] they may be classified as either "structural" measures of banking organization or variables reflecting the "demand" for banking services. All of the dependent and independent variables are listed in Table 2 with their identifying symbols, means, and standard deviations.

The estimated regression equations are derived in order to provide insight into the variations in chain banking among the several states. Specifically, we are testing the following hypothesis: The differences among states in observed measures of chain banking are not related to, or cannot be explained by, differences in variables that represent structural conditions of banking organization in each state and variables that are indicative of the level of demand for banking services.

Certainly one of the most important influences affecting the prevalence of chain banking within a state should be its branching policy. There is evidence available showing that many instances of multiple-bank ownership emerge because of state restrictions against branching,[6] lending credence to the generally-accepted belief that the practice is undertaken as a substitute for branch banking. Consequently, state branching policy—statewide, limited, or prohibited—is included as a dummy variable to reflect differences in state branching policies.

Chain banking may also be undertaken as an alternative to group banking.[7] If this is the case, we would expect an inverse relationship between measures of chain banking and those reflecting the importance of group banking. Therefore, two indicators of the relative importance of group banking within a state have been included. The first is the proportion of insured commercial banks controlled by registered bank holding companies, which shows the relative importance of the number of individual banks that are operating in group systems. The second is based on the ratio of group bank deposits to all deposits in the state, an alternative measure of group banking influence since a single large bank under holding-company control may greatly outweigh the deposit importance of several small banks under holding-company control.

Two other structural measures associated with banking-organization conditions at the state level have been included as potential determinants of chain banking structure. These are: (1) recent changes in the number of banks; and (2) population per banking office. States experiencing positive changes in the number of newly-organized banks during recent years have usually been unit-banking states. If branching is denied, it is possible that the owners of downtown banks will establish chains by organizing new banks in the suburbs in order to retain old customers or attract new ones.

Population per banking office is typically somewhat higher in unit-banking states. Since population is an important ingredient associated with the demand for banking services, higher populations per banking office should indicate a more pressing need for banking services—perhaps to be met by chain banking.

In the most fundamental sense, the growth of a banking institution is de-

[5] Kaufman and Latta, "Near Banks and Local Savings," *op. cit.*, p. 542.

[6] Jerome C. Darnell, "Chain Bank Ownership and Operation," *The National Banking Review*, 4, December 1966, pp. 193-198.

[7] Group banking, as used here, includes only those banks controlled by registered bank holding companies. The Bank Holding Company Act of 1956 defined a bank holding company as a company that (1) directly or indirectly controls 25 percent or more of the voting stock of two or more banks, or (2) controls in any manner the election of the majority of the directors of two or more banks. Holding companies meeting these criteria are required to register with the Federal Reserve Board.

pendent upon the economic health of the community it serves. Other things equal, we would expect those regions where economic conditions are better to have greater demand for banking services. Demand for banking services could be fulfilled by any one of the three types of multiple-office banking. However, by holding constant the effects of branch and group banking, we can observe the relationship between demand variables and the structural measures of chain banking. We would expect to see a positive influence on the extent of chain banking in those areas displaying greater demand for banking services.

The demand, of course, will be a function of income and of the population-industrialization mix. Consequently, the demand variables are of two types—those denoting income levels, and those reflecting population-industrialization characteristics. The variables measuring income levels are per capita personal income, percentage change in per capita personal income in the past decade, proportion of families having over $10,000 in income, and time deposits as a percentage of total deposits. Population-industrialization variables are: (1) percentage change in population in the past decade; (2) percentage of urban population; and (3) percentage change in nonagricultural employment in recent years.

II. Regression Models

The results obtained for the regression models are presented in Tables 3 and 4. In each table, the regression of primary interest is given first—the one relating the ratio of chain banks to member banks and the independent variables—and this is followed by the regression used for verification purposes.

A. Ratio of Chain Banks to Member Banks

The regression model using the ratio of chain banks to member banks as the dependent variable contains four of the five structural measures of banking organization, and five of seven demand variables.[8] About 34 percent of the interstate variation in this measure of chain banking is explained by the independent variables. The coefficient of multiple determination is significant at the 5 percent level; that is, the hypothesis of no significant difference between the explained and unexplained variation in the dependent variable is rejected. Nine independent variables are specified because the standard error of estimate accompanying this equation was the smallest. Equations specifying less than nine independent variables gave a larger standard error, a smaller value for R^2, and a smaller number of significant regression coefficients. The same was true when specifying more than nine independent variables, although R^2 was increased slightly.

Negative relationships are denoted between the dependent variable and branching policy and the measures of group banking influence, an expected outcome if chain banking is a substitute for the other forms of organization. The other structural measures, which in some

[8] We should explain why we have not included all 12 independent variables in each regression. The program employed was one in which the values of all variables are considered simultaneously, and in a step-wise fashion the program includes first the variable that has the highest coefficient of determination. In the second step, the variable that contributes the highest value to the coefficient of multiple determination is included. This process is repeated until all variables are included in the model, the criterion for order of selection being the contribution to the value of R^2.

With a given sample size, however, the inclusion of each additional variable reduces the degrees of freedom. Thus, the loss in degrees of freedom, may not be compensated for by the increase in the value of R^2. For the regressions in Table 3, it was found that specifying more than nine independent variables did not improve R^2 sufficiently to offset the degrees of freedom that would be lost, that is, R^2 was no longer statistically significant.

ways are merely substitute measures for unit banking, have positive regression coefficients. The regression coefficient for branching policy is the only one of the four having any statistical significance, and then only at the 10 percent level.

Two of the demand variables—percentage change in per capita personal income (PCPI), and percentage of families with over $10,000 in income—each display a negative association with the dependent variable. The negative coefficient attached to the change in PCPI can be explained by an examination of the states in which the income change was the greatest. Invariably in recent years, the states having larger income changes have been the ones with lower initial levels of PCPI. For instance, many of the southeastern and plains states have had large relative changes in incomes, although they remain below the national average of PCPI. Thus, we find a positive coefficient for the level of PCPI, reflecting demand for banking services, and a negative coefficient for the relative change in income—because the greatest changes have been occurring in the states where the income levels continue below the average.

The negative sign accompanying percentage of families over $10,000 in income may at first glance appear incongruous with the positive sign of PCPI. But this situation can be reconciled by recognizing that these variables are basically two different measures of income conditions. PCPI is merely a measure of average income level, and percentage of families over $10,000 in income reflects the distribution of the income level. Thus, we find that when income levels are higher, chain banking is more likely to occur. Yet this observation holds only to the extent that the income distribution is not markedly skewed in favor of high incomes.

The second regression model in Table 3 serves, in lieu of a time series, as a check on the reliability of the first. The second also includes nine explanatory variables, but only seven are common to both equations. The coefficient of multiple determination is practically the same in the second as in the first and is significant at the 5 percent level.

All five structural variables appear in the second equation, branching policy and percentage of deposits controlled by holding companies being the only two with negative coefficients. Contrary to the first equation, percentage of banks controlled by holding companies is specified and has a positive coefficient. Although the coefficient is not significant, it indicates that for all insured commercial banks, the number of chain banks is likely to be greater when the number of group banks is larger. This is an indication that chain banking and group banking may be more likely to exist side-by-side as an alternative to branch banking.

Each of the demand variables in the second regression is significant at either the 5 or 10 percent level. Percentage change in PCPI has a negative coefficient, as in the first regression. Although PCPI and percentage of families over $10,000 in income are not specified, percentage change in population is specified and has a negative coefficient.

It appears that the second regression model validates the first. The two models have seven out of nine explanatory variables in common, and their correlation measures are almost identical. Only if each state had the same proportion of insured commercial banks with membership in the Federal Reserve System, which is not the case, would we expect to find the same set of explanatory variables specified for each model.

B. Ratio of Chain-Bank Assets to Member-Bank Assets

Three structural and five demand variables explain 46 percent of the variation in the ratio of chain-bank assets to member-bank assets. Only eight variables are specified, because this particular

regression produced the smallest standard error of estimate—that is, specifying either a greater or smaller number of variables increased the standard error while not substantially improving the value of R^2 or yielding additional significant regression coefficients. The coefficient of multiple determination is significant at the one percent level.

All of the structural variables have a negative association with the dependent variable, indicating that chain banking is an alternative form of banking organization to both branch and group banking. State branching policy, however, is the only one of the three having a significant regression coefficient.

Two of the three income measures, PCPI and percentage of families over $10,000 in income, have highly significant coefficients. Similar to the first regression in Table 3, PCPI is positively associated with the chain bank-member bank asset ratio, and the percentage of families over $10,000 is negatively associated. The percentage change in PCPI is negatively associated, also as a consequence of states with higher levels of PCPI experiencing slower growth rates.

The regression coefficient of percentage change in population is significant at the 5 percent level and has a positive relationship; this would be expected if chain banking were an alternative to other forms of banking organization and if faster growing populations required more banking services. A positive coefficient accompanies the urbanization ratio, although the coefficient is significant only at the 10 percent level.

The second regression model in Table 4 provides a good check on the reliability of the first. The correlation measure for the second is only slightly less than for the first, but it is still significant at the one percent level. The same set of eight explanatory variables is specified in each equation.

III. Summary and Conclusions

The conclusions summarized here are drawn from multiple regression and correlation analyses in which measures of chain banking served as dependent variables, and in which variables related to banking-organization conditions and demand for banking services were incorporated as explanatory variables. It is impossible to test the stability of the regression estimates because chain-bank data are not available in a time series. Consequently, the regression estimates were derived by a cross-section analysis. A linear regression model was used, even though the relationship between the dependent and independent variables may not be one of linearity. Yet, the results obtained are adequate to justify certain conclusions.

The hypothesis set forth in Section I is rejected: a statistically-significant proportion of the observed variation in structural measures of chain banking among the various states *can* be explained by differences in variables representing structural conditions of banking organization, and by differences indicative of the level of demand for banking services. The proportion of total variation explained by these independent variables ranges from 34 percent for the ratio of chain banks to member banks, up to 46 percent for the ratio of chain-bank assets to member-bank assets. Thus, we may conclude that the regression and correlation models have useful and significant explanatory value.

In the estimated regression using the chain bank-member bank asset ratio as the dependent variable, the demand variables are more predominant than the structural variables. This finding would be anticipated because income levels should be more relevant in determining the amount of resources to be held by all banks. However, income levels should not be the determining factor dictating

the mix between assets held by chain banks as contrasted with nonchain banks. Only by holding constant the influence of other forms of multiple-office banking can we isolate the influence of demand variables. When this is accomplished, we find that there is a significantly larger proportion of member-bank assets held by chain banks in states having higher per capita personal income levels. Conversely, there is a highly significant negative relationship between the dependent variable and positively-skewed income distributions. Although the relationship is not statistically significant, states experiencing higher per capita personal income growth rates—typically the areas where average incomes have been lower initially—will generally not have as great an incidence of chain banking. Two other indicators of demand for banking services—change in population, and urbanization ratio—show significant positive relationships with the dependent variable.

Structural measures of banking organization at the state level assume more importance in determining the proportion of member-bank institutions that operate as chain banks, another expected outcome. Of these measures, the branching policy of a state stands out as the most important determinant. This empirical evidence, therefore, substantiates the long-held belief that chain banking is an alternative to branch banking. Branching policy appeared as an explanatory variable in all regressions, having a negative coefficient in each case that was statistically significant at either the 5 or 10 percent level. The relationship between chain and group banking is not as clearcut. A negative relationship exists between them, thus indicating some substitutability, although none of the regression coefficients was significant.

Two other variables describing banking-organization conditions show positive relationships with the proportion of member banks operating in chain systems. These are the number of newly-organized banks in recent years, and population per banking office. Unit-banking states have had the greatest number of new banks, and typically have higher populations per banking office. Thus, positive associations with the dependent variable are to be expected, since these measures may serve mainly as substitute variables for unit banking.

The absence of any information on the number of nonmember banks with common ownership links is a major obstacle to the discovery of a reliable indicator of the pervasiveness of multiple-bank ownership in the entire banking system.[9] Nevertheless, with the limited information available, we have gained more insight into chain banking than has previously been attained.

[9] The Federal Reserve Board for a time reported the number, location, and deposits of chain banks. This practice was discontinued after 1945.

Statistical Appendix

TABLE 1

Number and Assets of Chain Banks, by Region and State, June 30, 1962

Geographic division and state	Number of chain banks*	Percentage of member banks	Percentage of ins. com. banks	Assets of chain banks (Thousands of dollars)	Percentage of member bank assets	Percentage of ins. com. bank assets
United States	1,146	19.0	8.7	44,771,655	19.3	16.3
New England	62	23.8	15.9	2,249,214	22.0	18.7
Maine	2	7.1	4.9	8,227	1.4	1.0
New Hampshire	17	32.7	23.9	138,309	38.7	28.0
Vermont	5	16.7	9.6	37,977	16.2	8.0
Massachusetts	30	26.1	18.6	865,988	14.9	13.5
Rhode Island	3	60.0	37.5	921,260	96.3	90.0
Connecticut	5	16.7	8.3	277,453	12.2	9.7
Middle Atlantic	161	15.6	12.9	8,105,545	10.6	10.0
New York	51	15.6	14.0	2,003,517	3.7	3.6
New Jersey	32	15.7	13.4	1,845,158	23.8	21.4
Pennsylvania	78	15.6	12.0	4,256,870	28.3	24.7
East North Central	250	16.8	8.6	13,982,286	29.9	25.2
Ohio	44	12.2	7.7	3,119,074	26.5	23.7
Indiana	31	13.7	7.1	1,240,439	29.4	22.5
Illinois	111	21.2	11.3	6,271,476	34.7	30.0
Michigan	42	19.6	11.4	3,109,453	32.8	28.9
Wisconsin	22	13.8	3.9	241,844	7.4	4.6
West North Central	148	14.9	4.5	3,759,022	26.2	17.2
Minnesota	19	9.1	2.8	148,956	4.3	3.0
Iowa	13	8.0	2.0	147,861	7.9	4.1
Missouri	28	16.5	4.6	2,328,971	48.2	33.5
North Dakota	8	20.0	5.2	63,420	15.5	8.8
South Dakota	10	17.2	5.7	85,642	14.8	9.8
Nebraska	29	21.0	7.2	262,830	19.0	13.7
Kansas	41	19.3	7.0	721,342	40.7	25.0
South Atlantic	140	21.7	8.6	5,238,959	29.7	21.2
Delaware	1	20.0	5.3	334,831	64.7	41.0
Maryland	8	13.3	6.2	1,138,867	60.3	40.5
District of Columbia	2	25.0	18.2	498 857	30.1	26.9
Virginia	38	19.4	12.8	333,852	10.4	8.6
West Virginia	22	20.2	12.3	184,794	16.0	12.1
North Carolina	1	2.9	0.6	9,918	0.5	0.3
South Carolina	2	6.3	1.4	7,481	1.0	0.6
Georgia	4	5.9	1.1	33,349	1.4	1.4
Florida	62	46.6	19.1	2,697,010	66.7	46.2
East South Central	37	12.1	3.5	844,753	11.7	8.0
Kentucky	15	15.2	4.4	554,616	33.3	20.9
Tennessee	9	11.1	3.1	192,924	6.6	5.0
Alabama	11	11.8	4.6	78,013	4.1	3.2
Mississippi	2	5.9	1.1	19,200	2.6	1.2
West South Central	264	28.4	14.5	8,317,370	46.2	37.0
Arkansas	12	15.4	5.1	232.208	22.7	15.3
Louisiana	6	11.3	3.1	339.676	14.1	10.1
Oklahoma	82	36.3	21.2	865,428	32.7	27.4
Texas	164	28.7	16.2	6,880,058	57.6	47.8

TABLE 1 (Cont'd)

Mountain	83	26.5	16.7	1,988,119	27.2	22.8
Montana	15	17.0	12.3	80,977	10.4	8.9
Idaho	10	58.8	32.3	316,347	48.5	42.2
Wyoming	9	22.0	16.1	151,284	37.8	32.2
Colorado	34	34.7	20.2	1,182,826	59.7	49.4
New Mexico	11	28.9	18.6	110,476	17.6	13.3
Arizona	1	25.0	10.0	13,324	1.0	0.8
Utah	2	9.5	4.4	89,080	8.9	7.8
Nevada	1	20.0	14.3	43,805	8.9	7.7
Pacific	1	0.9	0.4	286,387	0.8	0.8
Washington	0	0.0	0.0	0	0.0	0.0
Oregon	0	0.0	0.0	0	0.0	0.0
California	1	1.8	0.8	286,387	1.0	1.0
Alaska	0	0.0	0.0	0	0.0	0.0
Hawaii	0	0.0	0.0	0	0.0	0.0

[a] Chain banks are defined as two or more banks having one or more stockholders in common (excluding banks controlled by registered bank holding companies) provided that: (1) the stockholder(s) in common is among the 20 largest stockholders in each bank, (2) the stockholder(s) in common is a director or an officer in each bank, and (3) if the stockholder(s) in common is not a director or an officer, he owns 5 percent or more of the stock in the bank in which he is not a director or officer.

Sources: U. S. Congress, House Committee on Banking and Currency, Subcommitte on Domestic Finance, **Twenty Largest Stockholders of Record in Member Banks of the Federal Reserve System,** 88th Congress, 2nd Session, Washington, D. C.: Government Printing Office, 1964; **Rand McNally International Bankers Directory,** Final 1962 Ed., Chicago: Rand McNally & Company, 1962; Federal Deposit Insurance Corporation, **Assets, Liabilities, and Capital Accounts of Commercial and Mutual Savings Banks,** Report of Call No. 60, June 30, 1962.

TABLE 2

Identification of Variables

	Mean	Standard deviation
Dependent variables		
X_1—Chain banks as a percentage of member banks, June 30, 1962	17.86	12.94
X_2—Chain banks as a percentage of insured commercial banks, June 30, 1962	9.66	8.42
X_3—Chain bank assets as a percentage of member bank assets, June 30, 1962	22.26	21.93
X_4—Chain bank assets as a percentage of insured commercial bank assets, June 30, 1962	17.22	17.86
Structural measures of banking organization		
S_1—State branching policy: 1—statewide or limited branching; 0—unit banking	0.65	0.48
S_2—Percentage of insured commercial banks controlled by registered bank holding companies, June 30, 1962	4.69	7.04
S_3—Percentage of all commercial bank deposits controlled by registered bank holding companies, June 30, 1962	12.94	18.71
S_4—Percentage change in number of commercial banks, 1959-1962	−0.43	8.98
S_5—Population per banking office, 1960	7160.94	2260.38
Demand variables		
I_1—Per capita personal income, (U. S. = 100), 1962	95.17	19.40
I_2—Percentage change in per capita personal income, 1953-1962	35.37	10.88
I_3—Percentage of families over $10,000 in income, 1959	13.60	5.42
I_4—Time deposits as a percentage of total deposits, June 30, 1962	47.01	12.85
P_1—Percentage change in population, 1950-1960	19.72	20.34
P_2—Percentage of population, urban, 1960	62.51	15.86
P_3—Percentage change in nonagricultural employment, 1957-1962	8.37	9.07

TABLE 3

Regression and Correlation Models of Chain Banking Structure (Standard errors in parentheses)

Dependent variable	Constant	S_1	S_3	S_4	S_5	I_1	I_2
X_1	5.317	− 7.2474 (4.2933)*	− 0.0929 (0.1112)	0.2370 (0.2432)	0.0014 (0.0009)	0.3695 (0.1976)*	− 0.3745 (0.2067)*
		I_3	I_4	P_3	R^2	F Ratio	S. E.
		− 1.7939 (0.7845)†	0.1684 (0.1487)	0.3723 (0.2644)	0.3413	2.361†	11.60
Dependent variable	Constant	S_1	S_2	S_3	S_4	S_5	I_2
X_2	5.2863	− 5.3307 (2.7764)*	0.2993 (0.2931)	− 0.1232 (0.1068)	0.0619 (0.1602)	0.0011 (0.0006)*	− 0.3130 (0.1499)†
		I_4	P_1	P_3	R^2	F Ratio	S. E.
		0.2326 (0.0955)†	− 0.1756 (0.0923)*	0.4131 (0.2116)*	.3314	2.258†	7.60

* Significant at 10 percent level.
† Significant at 5 percent level.

TABLE 4

Regression and Correlation Models of Chain Banking Structure (Standard errors in parentheses)

Dependent variable	Constant	S_1	S_2	S_3	I_1	I_2	I_3
X_3	− 8.6081	− 13.2742 (5.7251)†	− 0.9548 (0.6478)	− 0.2076 (0.2263)	0.9381 (0.3226)‡	− 0.4109 (0.2889)	− 4.5064 (1.2681)‡
		P_1	P_2	R^2	F Ratio	S. E.	
		0.4168 (0.1729)†	0.3988 (0.2195)*	.4624	4.516‡	17.54	
Dependent variable	Constant	S_1	S_2	S_3	I_1	I_2	I_3
X_4	− 3.3225	− 9.8968 (4.7728)†	− 0.6099 (0.5400)	− 0.1497 (0.1887)	0.6295 (0.2689)†	− 0.4287 (0.2408)*	− 3.2746 (1.0571)‡
		P_1	P_2	R^2	F Ratio	S. E.	
		0.2393 (0.1441)	0.4288 (0.1830)†	.4369	4.074‡	14.63	

* Significant at 10 percent level.
† Significant at 5 percent level.
‡ Significant at 1 percent level.

► DAVID I. FAND and THOMAS BRADY

Free Reserves and the Supply of Deposits

In recent years, there have been attempts to estimate and analyze money-supply functions for the U. S. Friedman and Cagan, for example, have used an identity to specify the crucial determinants over a given period of time; Brunner and Meltzer have developed a linear and a non-linear theory to estimate the relative importance of different variables; Teigen, DeLeeuw, and Goldfeld have employed a reduced form of an econometric model of the financial sector; and Meigs has utilized the free-reserve model to estimate a deposit-supply function for the commercial banking system.[1]

We will define, construct, and estimate deposit-supply functions based on the free-reserve hypothesis. In Section I, we discuss the notion of desired free reserves, or a desired free-reserve ratio, and the variables that may affect them; in Section II, we introduce linear approximations to these stock (equilibrium) free-reserve equations and develop dynamic models based on stock-adjustment equations to predict actual changes in free reserves; in Section

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[1] For an analysis of these money-supply functions, see David I. Fand, "Some Implications of Money Supply Analysis," *American Economic Review*, Papers and Proceedings of the Seventy-ninth Annual Meeting, LVII, May 1967, pp. 380-400; and William G. Dewald, "Money Supply Versus Interest Rates As Proximate Objectives of Monetary Policy," *The National Banking Review*, 3, June 1966, pp. 509-522.

III, we combine the stock-adjustment equations with appropriate identities to construct deposit-supply functions; in Section IV, we summarize our main findings for the free-reserve equations and the deposit-supply functions. Our conclusions are presented in Section V.

I. Free Reserve Theory

Free reserves are defined as total reserves (R_T) minus the required reserves (R_R) and the borrowed reserves (R_B) of the member banks of the Federal Reserve System: $R_F = R_T - R_R - R_B$. Since excess reserves are equal to $R_T - R_R$, we may also write $R_F = R_E - R_B$ where R_E measures excess reserves. Thus, free reserves are the excess reserves held by the banking system that have not been borrowed. In this paper, we are concerned with the manner in which a profit-maximizing bank determines the desired level of excess and borrowed reserves, the relation between desired free reserves and actual free reserves, and the way in which a discrepancy between desired and actual free reserves may influence bank behavior.[2]

There are two main theories which explain the relation between borrowed reserves and bank behavior. The "reserve position" theory asserts that banks are extremely reluctant to incur indebtedness, and concludes that a bank will borrow from the Federal Reserve only when circumstances beyond its control (such as open market sales by the Federal Reserve, or larger than anticipated withdrawals) cause excess reserves to fall below a minimum acceptable level. According to this view, banks are insensitive to the cost of borrowing, because indebtedness to the central bank has a strong inhibitive effect on bank lending policies.[3]

The "profit" theory of borrowing holds, on the other hand, that, while some banks may be reluctant to do so, the banking system will borrow if such action will increase their profits. According to this theory, the volume of borrowing is sensitive to interest rates and will be a function of the profitability of open-market loans relative to the discount rate. The "free reserve" theory is a further development of the "profit" theory of borrowing: it emphasizes interest rates and compares the return on loans relative to the cost of additional reserves; but, instead of singling out the volume of borrowings, this theory attempts to explain the combined movements in both borrowed reserves and excess reserves, focusing therefore on the volume of net excess reserves (posi-

[2] A comprehensive history and critical analysis of the literature on free-reserves is presented in A. James Meigs, *Free Reserves and the Money Supply*, Chicago: University of Chicago Press, 1962.

[3] The "reserve position" theory held that total reserves are not a good measure of monetary policy. For example, in a period of restrictive policy, the banking system may offset open-market sales by borrowing reserves from the Federal Reserve. According to the reserve-position theory, however, monetary restraint will be realized even if total member bank reserves remain unchanged, since the increase in borrowing causes the banks to be more restrictive in their lending policies.

It is interesting to note the development of the free-reserves concept as an indicator of monetary policy. An earlier view held that the level of excess reserves could be used to measure the degree of ease or stringency in the banking system. This view, however, failed to recognize that member banks could offset a restrictive monetary policy by borrowing and maintaining excess reserves, and to remedy this deficiency, the concept of free reserves evolved.

The usefulness of free reserves as a gauge of monetary policy depends partly on the "real-bills" doctrine and partly on the "reserve-position" theory. For a fuller explanation of the development of the concept "free reserves," see "Genesis and Development of the Free Reserve Conception of Monetary Processes," by K. Brunner and A. H. Meltzer, reprinted in *Readings in Money, National Income and Stabilization Policy*, W. Smith and R. Teigen, eds., Homewood, Illinois: Irwin, 1965.

tive free reserves) or net borrowed reserves (negative free reserves).

The free-reserve model, which developed from this discussion during the 1920's and 1930's, was thus particularly concerned with the cost of borrowing relative to the opportunity cost of holding excess reserves.[4] Let the investment opportunities or the net returns that a bank can earn on assets be measured by a vector, r, and let the cost of obtaining additional reserves be measured by c. The Treasury-bill rate, or some other short-term rate that is highly sensitive to market forces, is often used as a proxy for the spectrum of rates contained in r; we shall adopt this convention and assume that there is a rate which may be used to identify the opportunity costs given by the vector r. Similarly, although there are many ways in which an individual bank may obtain additional reserves (by selling assets, through inter-bank deposits, or buying Federal funds), and although there may be some reluctance of banks to borrow, we shall nevertheless take the discount rate as a measure summarizing the cost of borrowing.[5]

Using these measures, let us now examine how the yields in r and the interest rates in c affect the desired free reserves of member banks. With respect to borrowed reserves, we assume that a bank will use the discount window to acquire reserves in a manner that is consistent with utility maximization. We further assume that borrowers are *almost* always accommodated and that the supply of Federal Reserve discounts and advances to member banks is perfectly elastic at the prevailing discount rate. It may appear that banks would borrow indefinitely so long as the discount rate was below market rates, but this overlooks the fact that the banks are concerned with portfolio risk as well as expected return and that the risks of capital loss increase with increased borrowings. In addition, the demand for borrowed reserves is also influenced by expectations concerning receipts, payments, and the structure of yields. We therefore postulate that the demand for borrowed reserves would increase (though at a decreasing rate) with market yields and interest rates, but would move inversely to the discount rate. To introduce a scale variable, we assume that the demand for borrowed reserves is a function of deposits.[6] We therefore write:

$$R_B^* = B\ (r,c,D),$$

where R_B^* gives the desired amount of borrowed reserves.

The demand for excess reserves is also a function of market rates and the discount rate. We expect an inverse relation

[4] The views of Riefler, Burgess, Currie, Keynes, Turner, Hardy and Tinbergen are analyzed in Meigs, *op. cit.*, Chapter 2. See, also, the analysis of member bank borrowing in Murray E. Polakoff, "Reluctance Elasticity, Least Cost, and Member-Bank Borrowing: A Suggested Interpretation," *The Journal of Finance*, XIV, March 1960, pp. 1-18; and the analysis of borrowings and excess reserves in William G. Dewald, "Free Reserves, Total Reserves, and Monetary Control," *The Journal of Political Economy*, LXXI, April 1963, pp. 141-153.

[5] To the extent that the banking system could influence the public to hold time deposits instead of demand deposits, or demand deposits instead of currency, it would be able to increase its free reserves. We abstract from these two possibilities since they are not under the direct control of the banking system.

[6] Since many investigators use the deposit variable in their free-reserve equation, we have included it both in the R_B^* and R_E^* equations. The theoretical justification is not entirely clear. Some justify the use of deposits as a wealth or as a transactions variable; others, as a measure of portfolio risk; and yet others, like Meigs, assume that free reserves are homogenous in deposits. For a discussion of this point, see Richard G. Davis, "Open Market Operations, Interest Rates, and Deposit Growth," *The Quarterly Journal of Economics*, LXXIX, August 1965, pp. 431-454, and "Testing Some Variants of the Free Reserve Hypothesis," unpublished paper; and Michael L. Wachter, "A Dynamic Free Reserve Equation," unpublished paper.

between the demand for excess reserves and market interest rates, since the incentive to hold idle cash diminishes as market interest rates rise; and similarly, the relative importance of transactions costs also diminishes. And since borrowed reserves may be substituted for excess reserves, we expect that the demand for excess reserves is an increasing function of the discount rate. Finally, to accord with prevailing views, we assume that the demand for excess reserves varies with deposits. We therefore write:

$$R_E^* = E(r,c,D),$$

where R_E^* gives the desired amount of excess reserves.

The *desired* or *target* level of free reserves is derived by taking the difference of these two functions, and is therefore also a function of r, c, and D. We therefore write:

$$R_F^* = R_E^* - R_B^* = F(r,c,D), \qquad (1)$$

with the following properties:

$$\frac{\partial R_F^*}{\partial r} < 0, \frac{\partial R_F^*}{\partial c} > 0, \text{ and } \frac{\partial R_F^*}{\partial D} > 0.$$

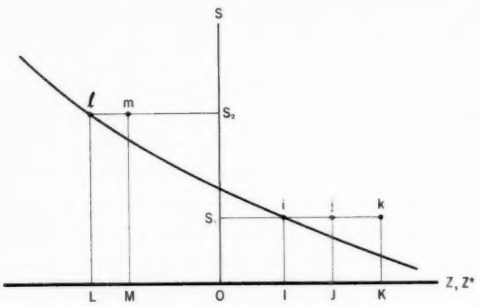
Even this simple model of the stock demand for free reserves has interesting implications which may be illustrated in a convenient diagram developed by Meigs. We shall follow his treatment and assume that the R_F^* equation is homogeneous in deposits,

$$(R_F/D)^* = Z^* = f(r,c), \qquad (2)$$

which implies that the banking system has a target free-reserve *ratio* rather than a target *level* of free reserves. Let us also assume that we can approximate the function f(r,c) by some function, f(s), where s is the spread between the market rates in r and the costs in c. This formulation enables us to simplify the presentation; it is also a plausible specification since the spread is perhaps the simplest way of comparing the net market rate of return with the cost of borrowing.

The relation between the desired free-reserve ratio and the yield spread, s, is illustrated in the Figure. The stock-

Long Run Schedule of Z* for Different Values of the Spread, (r—c)



demand curve shows the desired, or equilibrium values, of Z for each value of s. Thus, if actual Z = OI when s = s_1, desired Z is equal to actual Z and the system is in long-run or stock equilibrium.

If the combinations of Z and s were represented by points j or k, actual Z would exceed desired Z, causing the free-reserve ratio to fall. Banks may reduce Z and move toward equilibrium by creating deposits either with excess reserves or with additional borrowings. Meigs has also shown, by an imaginative use of the Figure, that a failure to distinguish between desired and actual free reserves could result in a serious misinterpretation of the impact of monetary policy. For example, say that the banking system is in equilibrium with s = s_1 and Z = OI. Now let s rise to s_2. The system will tend to move towards a new equilibrium represented by point *l*, through reducing Z from OI to OL. Suppose, however, that the rise in s is such that a restrictive monetary policy is called for, and that the Federal Reserve sells securities on the open market. If the Federal Reserve moved quickly, it could reduce Z to OL before the banking system could react to the increase in s. In this case, the rise in s would not result in any increase in deposits. If, on the other hand, it did nothing, the fall in Z from OI to OL would take place but it would be at the initiative of the banking system. This, however, necessarily implies an expansion

of deposits. In both cases, the free-reserve ratio would fall: in the first case, the Federal Reserve is successfully executing a restrictive policy; in the second case, its action (or inaction) is, in effect, equivalent to an expansionary policy.[7]

Meigs also shows how the Federal Reserve could, unwittingly, be actively expansionary in these circumstances. Suppose it decided to initiate restrictive monetary policy when s rises to s_2, by reducing the free-reserve ratio from OI to OM. If it operates to keep actual Z at OM, it will have to supply reserves, since the banking system will seek to move Z to OL, which is the desired or target free-reserve ratio given by the demand curve. Presumably, the error would become apparent after a time but, in the meanwhile, the Federal Reserve would be expansionary at a time when it believed it was following a restrictive policy.

II. An Operational Test of Free-Reserve Behavior

To obtain an operational theory of free-reserve behavior, we need to analyze how the banking system behaves when it is not in equilibrium. Meigs, in his development of the theory, postulates that the desired rate of adjustment of the actual free-reserve ratio to the desired ratio is a function of the gap between the desired and actual values of Z. (Thus, in the Figure, when $s = s_1$, the gap between actual Z and desired Z is IJ when Z = OJ and IK at Z = OK.) If we assume that the desired change is equal to the actual change, we have the following stock adjustment equation:

$$\triangle Z = \alpha (Z^* - Z_{-1}). \qquad (3)$$

According to this assumption, the change in Z in any period is equal to a proportion, α, of the difference between the desired Z during the period and Z_{-1}, the actual Z at the beginning of the period. Similarly, if we work with a model of R_F, the stock adjustment equation is:

$$\triangle R_F = \alpha (R_F^* - R_{F-1}). \qquad (4)$$

This dynamic assumption makes it possible to develop an operational test of the free-reserve theory. But two additional developments are needed before we test the theory empirically: we need to specify the function defining the desired quantities, R_F^* and Z^*, since they are not directly observable; and it is necessary to modify the two stock-adjustment equations to take account of open market operations, since both assume that unborrowed reserves are constant.

To define the determinants of the desired or target level of R_F or Z in terms of observable variables, we shall, following our discussion in Section I, substitute the spread, s, for the r and c variables and linearize the function. Accordingly, we specify Z^* by the linear function:

$$Z^* = (a_0 + a_1 s). \qquad (5)$$

Substituting this function into the stock-adjustment equation 3, we get:

$$\triangle Z = \alpha (a_0 + a_1 s) - \alpha Z_{-1}, \qquad (6)$$

where α is the coefficient of adjustment.

Similarly, if we specify R_F^* by the linear (and homogeneous) function:

$$R_F^* = (a_0 + a_1 s) D, \text{ and} \qquad (7)$$

substitute this function into stock adjustment equation 4, we get:

$$\triangle R_F = \alpha (a_0 + a_1 s) D - \alpha R_{F-1}.[8] \qquad (8)$$

When nonborrowed reserves are constant, $\triangle R_u = 0$, equations 6 and 8 provide regression equations for predicting changes in free reserves or in the free-reserve ratio which can be tested empirically, since all the variables in these equations are now directly observable.

Suppose now that unborrowed reserves are changing, $\triangle R_u \neq 0$, because the Federal Reserve is conducting open market operations. In these circumstances,

[7] This example shows the connection between free-reserve behavior, the behavior of unborrowed reserves, and the supply of deposits which we shall analyze.

[8] We have also experimented with $R_F^* = a_0 + a_1 s + a_2 D$, but this performs very poorly in the econometric tests.

actual changes in R_F or Z *during* a period will depend on (1) the banking system's attempts to close the gap between the desired level and the actual level at the *beginning* of the period, and (2) any changes in unborrowed reserves initiated by the Federal Reserve *during* the period. Let us first consider the effect of $\triangle R_u$ on the $\triangle R_F$ equation.

To analyze the relation between changes in unborrowed reserves and changes in free reserves, assume that the system is initially in equilibrium, that the yield variables remain fixed, and that $R_F^* = R_{F-1}$ throughout the period.[9] From the definition of R_F, it follows that the immediate consequence of a given change in R_U will be an equal change in R_F. However, since this increase in R_F is not desired by the banking system, it will presumably be offset to some extent. The question is, how much of the resulting movement of R_F away from R_F^* will be offset by the banking system? It is not clear whether this gap between R_F^* and R_F, caused by an increase in R_U, is offset at the same rate as a gap caused by interest-rate movements. (The rate would be different, for instance, if the banking system were more certain of the permanence of changes in borrowed reserves relative to changes in interest rates.)

Let the proportion of $\triangle R_U$ that is offset be γ (where γ may or may not be equal to α). Since we assumed that the banking system was in equilibrium initially with $R_F^* = R_{F-1}$, the net change in R_F over a period will be equal to the increase in unborrowed reserves that is not offset and is therefore given by $(1-\gamma)\ \triangle R_U$. (The part of $\triangle R_U$ which is not offset during the period is, of course, included in R_{F-1} in the next period.) If we now consider changes in unborrowed reserves when the banking system is out of equilibrium, that is when $R_F^* \neq R_{F-1}$, the total change in free reserves is given by:

$$\triangle R_F = (1-\gamma)\ \triangle R_U + \alpha(a_0+a_1 s)\ D - \alpha\ R_{F-1}. \quad (9)$$

If we divide by D, this may also be expressed as:

$$\triangle R_F/D = (1-\gamma)\triangle R_U/D + \alpha(a_0+a_1 s) - \alpha\ R_{F-1}/D. \quad (10)$$

Similarly, when we introduce a non-zero $\triangle R_U$ into the $\triangle Z$ equations, the resulting equation may be approximated by:

$$\triangle Z = \alpha(a_0+a_1 s) - \alpha Z_{-1} + (1-\gamma)\ (\triangle R_U/D). \quad (11)$$

Adding Z_{-1} from both sides would give us an alternative form:

$$Z = \alpha(a_0+a_1 s) + (1-\alpha)Z_{-1} + (1-\gamma)\ (\triangle R_U/D). \quad (11a)$$

Since all variables in the three equations 10, 11, and 11a are observable, we can test them for $\triangle R_F/D$, $\triangle Z$, and Z.[10]

III. Deposit-Supply Functions

To construct a supply function predicting changes either in deposits or in the rate of growth of deposits, we need to relate actions taken by the banking system with respect to free reserves and actions taken by the Federal Reserve with respect to $\triangle R_U$.[11] This means that we need to combine the equations for

[9] The interest-rate coefficients are likely to be biased if we do not take account of changes in unborrowed reserves. For example, an open market purchase which generates new reserves may simultaneously lower r and raise R_F. According to the hypothesis, the fall in r will cause R_F^* to rise, and this of course is what we are attempting to estimate in the regressions. But, since R_F will also be rising because of the increase in R_U, the computed regression coefficient of r is likely to reflect both effects and thus be overstated (absolutely).

[10] We could also test equation 9, which is algebraically equivalent to equation 10. However, the introduction of D as a multiplicative factor appears to introduce multicollinearity among the independent variables. The distinction between α and γ has been pointed out to us by Richard G. Davis.

[11] Deposits, as used in this paper, include all deposits, demand and time, that are subject to reserve requirements, since the identities

$\triangle R_F$ and $\triangle Z$ with the appropriate deposit identities. The first identity we use is:

$$\triangle D/D = \triangle R_U/R_U - (D/R_U)\triangle Z, \quad (12)$$

where $\triangle D/D$ and $\triangle R_U/R_U$ measure the percentage change, or rate of growth, of deposits and unborrowed reserves in any period, and where D, R_U and $\triangle Z$ have already been defined. To construct a supply function, assume provisionally that $\triangle R_U = 0$. On this assumption, the identity is:

$$\triangle D/D = -(D/R_U)\triangle Z. \quad (13)$$

If we substitute the equation for $\triangle Z$ in equation 6 into this identity, we obtain:

$$\triangle D/D = -\alpha(D/R_U)(Z^* - Z_{-1}) - \alpha\frac{D}{R_U}(a_0 + a_1 s - Z_{-1}). \quad (14)$$

This equation may be viewed as a deposit-supply function for the special case of constant unborrowed reserves. The regression variables are s, lagged Z, and D/R_U, where the latter is introduced as a multiplicative factor. To develop the relation between the supply of deposits and free reserves under more general conditions, substitute the full specification of $\triangle Z$ (equation 11) into the identity (equation 12). This gives equation 15, estimating the percentage change or the rate of growth in deposits, taking into account both the free-reserve adjustment and changes in unborrowed reserves:

$$\frac{\triangle D}{D} = \gamma\frac{\triangle R_U}{R_U} - \alpha\frac{D}{R_U}(a_0 + a_1 s) + \alpha\frac{D}{R_U}Z_{-1}.^{12} \quad (15)$$

The regression variables in this supply function include $\triangle R_U/R_U$ in addition to s, Z_{-1}, and D/R_U, which were included in equation 14.

A second identity may be used to develop a deposit-supply function which is based on $\triangle R_F$:

$$\frac{\triangle D}{D} = \frac{\triangle R_U}{R_U} - \frac{\triangle R_F}{R_F}. \quad (16)$$

In our empirical work, we have used $\triangle R_F$ equation to obtain the supply function:

$$\frac{\triangle D}{D} = \gamma\frac{\triangle R_U}{R_U} - \alpha\left(\frac{a_0}{R_R} + \frac{a_1 s}{R_R}\right) + \alpha\frac{R_{F-1}}{R_F}. \quad (17)$$

The regression variables are s, lagged R_F, $\triangle R_U$, and $1/R_R$, the latter entering as a multiplicative factor.[13]

IV. Findings

In our econometric work, we have tried to resolve some of the issues discussed in this paper. Since there is considerable difference as to the proper specification of deposits in the free-reserve equation, we have experimented with several formulations in which the dependent variables are R_F, $\triangle R_F$, Z, $\triangle Z$, and $\triangle R_F/D$. We have also experimented with different ways of introducing the yield and cost variables; with both monthly and quarterly data; with data corrected for changes in reserve requirements as well as uncorrected data; and with different subperiods. We have compiled a repre-

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are based on required reserves and are defined for this measure of deposits. There will therefore be a slight discrepancy between our deposit total and the deposit component of the money supply at member banks.

[12] This equation can be derived by starting with the deposit identity $D \equiv \frac{R_U}{K + Z}$, where $K = \frac{R_R}{D}$, rewriting it in logarithmic form, and taking differentials. Similarly, if we start with the deposit identity $D \equiv \frac{R_U - R_F}{K}$ and perform the same operation we obtain equation 16. We ignore $\triangle K$ in the text because the data we use are corrected for changes in K.

[13] As mentioned earlier, the $\triangle R_F$ equations do not perform well when D enters linearly, and multicollinearity is introduced if D enters multiplicatively. For these reasons, we use the best $\triangle R_F$ equation, $\triangle R_F = \alpha(a_0 + a_1 s) - \alpha R_{F-1}$ in the identity.

sentative selection of our results with the free-reserve equations for R_F, Z, $\triangle Z$ and $\triangle R_F/D$ in Table 1. Our results for the deposit-supply function are shown in Table 2. Some of the substantive findings may be briefly summarized.

A. The Role of Interest Rates

Our experiments with alternative formulations of the free-reserve equations suggest that interest rates are significant in determining free reserves. In our empirical work, we used the Treasury-bill rate, r_b, to measure net return, r, and the discount rate, r_d, to represent the cost, c, and $(r_b - r_d)$ to measure the spread.[14] The t values for the coefficients of the spread variable range from –3.06 to –3.45, the t values for the r_b coefficients range from -2.18 to -2.24, while the t values for the r_d coefficients range from .64 to .96 and are not significant. These results, for the four dependent variables in Table 1, tend to confirm previous findings by other investigators in favor of the "free-reserve" as opposed to the "reserve-position" theory.[15]

B. The Determinants of Desired Free Reserves

There is some question as to the proper specification of the function R_F^* defining free reserves. Many investigators assume that R_F^* is linked to the total portfolio, and that banks choose an absolute level of free reserves; thus, their equations include D, which serves as a scale variable. Other analysts assume that R_F^* is homogeneous in deposits and that banks decide on a ratio; they, therefore, work with the desired ratio $(R_F/D)^*$.[16] Our findings suggest that we get the best results in those models which assume that R_F^* is linear and homogeneous in deposits. This includes the regressions where the dependent variable is R_F/D, Z, or $\triangle Z$. In the linear models where the deposit variable is brought in additively, the regression coefficient has the wrong sign and is usually not significant. But, we also find—and this may be somewhat surprising—that the stock-adjustment, free-reserve equations which do not contain deposits at all do almost as well as those that assume that R_F^* is homogeneous in deposits. The R^2 are .925 and .927, respectively.

C. The Specification of Yields and Interest Rates

Having selected r_b, the Treasury-bill rate, and r_d, the discount rate, to measure r and c, we still need to specify how the yield and cost variables are to be included in the Z and R_F functions. Consider $Z^* = f(r,c)$. The simplest way is to use a spread, s, as a single variable, instead of using both r and c, and to approximate $f(r,c)$ by $a_o + a_1 s$. Alternatively, if we assume that banks consider both yield and cost separately, we should approximate $f(r,c)$ by $a_o + a_1(r) + a_2(c)$. We may also analyze the case where banks react to r and to the spread, and thus approximate $f(r,c)$ by $a_o + a_1(r) + a_2(r-c)$. Finally, we have also considered the possibility that desired free reserves are non-linear in interest rates,

[14] Although we tried the Federal-funds rate and other interest rates, we find the best empirical measures of r and c in our models are given by the Treasury-bill rates and the discount rate (N. Y. Federal Reserve bank), respectively.

[15] See, however, the questions raised by Phillip Cagan in "Interest Rates and Bank Reserves—A Reinterpretation of the Statistical Association," unpublished paper.

[16] For a more general analysis of both free and secondary reserves, see the theory developed by James Tobin in *Monetary Theory*, unpublished manuscript. Tobin attempts to explain both the composition and size of a bank's defensive position. Stephen M. Goldfeld in *Commercial Bank Behavior and Economic Activity*, New York: Humanities Press, Inc., 1966, reviews the formulations of Tobin and Meigs, *op. cit.*, and presents separate estimates for excess and borrowed reserves. See also J. L. Pierce, "Commercial Bank Liquidity," *Federal Reserve Bulletin*, August 1966.

TABLE 1

Regression Coefficients for Alternative Free Reserve Equations, 1959 I-1966 II Quarterly*

Dependent variable	r_b	r_d	$r_b - r_d$	$\frac{\Delta R_u}{D}$	ΔR_u	R_{F-1}	$\frac{R_{F-1}}{D}$	Z_{-1}	R^2
R_F			−234.94 (−3.45)		.2418 (3.32)	.8130 (12.89)			.9195
R_F	−177.40 (−2.24)	83.32 (.64)			.2620 (3.58)	.7139 (7.47)			.9253
$\frac{\Delta R_F}{D}$			−.00123 (−3.10)	.2814 (3.78)			−.20436 (−3.35)		.6112
$\frac{\Delta R_F}{D}$	−.00102 (−2.18)	.0007 (.96)		.2937 (3.86)			−.25986 (−2.94)		.6232
Z			−.00122 (−3.06)	.2805 (3.76)				.7884 (13.02)	.9246
Z	−.00102 (−2.18)	.0007 (.96)		.2925 (3.83)				.7348 (8.36)	.9268
ΔZ			−.00122 (−3.06)	.2805 (3.76)				−.21161 (−3.50)	.6111
ΔZ	−.00102 (−2.18)	.0007 (.96)		.2925 (3.83)				−.26524 (−3.02)	.6224

* The figures in parentheses are the t values for each coefficient.

by using reciprocals of r and c and writing $f(r,c) = a_o + (a_1/r) + (a_2/c)$.

Generally, we get our best results in the first two cases where we work with:

$f(r,c) = a_o + a_1 s$,

or $f(r,c) = a_o + a_1 r + a_2 c$,

and these are the two specifications included in Table 1.

D. The Coefficient of Adjustment

In our models, we have found it useful to introduce two separate coefficients of adjustment, α and γ. When the discrepancy between R_F^* and R_{F-1} is caused by a change in one of the determinants of R_F^* the adjustment coefficient is α. If, however, the discrepancy arises from actions by the Federal Reserve in changing unborrowed reserves, the adjustment coefficient is γ.

There is no obvious reason why banks should respond to the two discrepancies in the same way. Clearly, this depends in large measure on whether banks consider these changes as permanent or temporary, and on how much time elapses after the change has taken place before they recognize it and are willing to take action.

We find that α is typically between .2 and .3, while γ ranges from .70 to .76. If this finding is valid, it suggests that banks respond to Federal Reserve action more quickly than to changes affecting desired free reserves. We also find that α varies with the specification of yields whereas γ does not. If α is indeed a function of interest rates, it is consistent with our notion that α is related to discrepancies associated with changes in r and c, while γ is related to discrepancies associated with changes in R_U. We also find that estimates of α in the quarterly data are approximately three times as large as

TABLE 2

Regression Coefficients for Deposit Supply Functions,* $(\frac{\triangle D}{D})$

$\frac{\triangle R_u}{R_u}$	$\frac{\triangle R_u}{R_R}$	$\frac{D}{R_u}(r_b - r_d)$	$\frac{I}{R_R}(r_b - r_d)$	$\frac{D}{R_u} Z_{-1}$	$\frac{R_{F-1}}{R_R}$	R^2	Period
.5006		.00160		.3295		.8115	1959 I —
(7.68)		(4.50)		(6.12)			1966 II
.5414		.00042		.1078		.8150	JAN. 1959—
(18.05)		(3.19)		(4.59)			JUNE 1966
	.5006		271.56		.3248	.8195	1959 I —
	(7.92)		(4.81)		(6.20)		1966 II
	.5358		74.55		.1065	.8150	JAN. 1959—
	(18.03)		(3.46)		(4.54)		JUNE 1966

* The figures in parentheses are the t values for each coefficient.

the α estimates in the regressions using monthly data. We do not find any consistent pattern for γ.

E. Deposit-Supply Functions

In Table 2, we summarize the regression coefficients for the deposit supply function. These equations predict $\triangle D/D$, the percentage change in deposits in a period, and use both quarterly and monthly data. We find that interest rates are significant, with a t value for the spread ranging from 3.19 to 4.81, whether we use an indentity based on $\triangle Z$ or $\triangle R_F$, and whether we use quarterly or monthly data. We also find that estimated α and γ in the $\triangle D/D$ equations are closer to each other than to the estimates obtained from the R_F and Z equations. The R^2 are approximately .80.

V. *Conclusions*

The free-reserve models that we have analyzed in this paper summarize commercial-bank portfolio behavior in terms of a few variables, and thereby open up the possibility of using these variables in deriving a deposit-supply function. The appeal of this approach is that it provides a fairly simple model for developing an important building block in the theory of the money-supply process. The drawback is that we are attempting to explain an intricate and complex reality in terms of a few variables. For this reason, many investigators prefer to use a more complex econometric model of the financial sector which includes demand and supply conditions for individual financial markets, and then employ these structural equations to obtain a reduced-form supply function for deposits and money.

It is recognized that in using a free-reserve model to derive a supply function for the banking system, we run the serious risk of oversimplifying and of omitting important variables. But it is also recognized that important variables or relationships may be neglected because a model attempts to do so much descriptively that it may overlook some analytical issues. We cannot say at this point which of the various frameworks will prove most successful, and it is therefore desirable that different approaches be tried. Irrespective of which approach proves to be most useful, we believe that the free-reserve model captures a crucial ingredient of commercial-bank behavior and that, for this reason alone, additional

work on this model is justified.

Accordingly, we list several issues that could be clarified in future research, and which would greatly facilitate the usefulness of the free-reserve approach.

1. Our estimates of the coefficients of adjustment, α, are low, and this is also true in other econometric studies.[17] Yet, many analysts argue that an α of .2 is unrealistic in markets where there are no necessary time lags, as is the case with investment in physical plant. Although our work seems to suggest they are not equal, we believe that more work needs to be done to determine whether α and γ are equal or not. Finally, we should note that, as we have set up the model, α and γ measure the lag between the decision to act and the completion of the action. But it is possible that we are confusing a recognition lag with an action lag.

2. Our model assumes that banks react to current market rates or to current changes in R_U, but that only part of the adjustment is completed in one period. Some of our work provides evidence that banks react to interest rates after some time lag, but they may act quickly once they have decided to act. If so, we are not properly identifying the nature of the lag.

3. The specification of deposits in the R_F^* equation is not entirely satisfactory. Although Meigs and others assume homogeneity and begin their analysis by assuming that $Z^* = (R_F/D)^*$ is the dependent variable, there is need for further analysis of this point.

Also, we have followed other investigators in linking R_F to a deposit total which includes time deposits. It may be desirable to test a model which links R_F primarily to demand deposits.

4. We have simplified the problem by assuming that the stock-adjustment equation for the *desired* change may be used to predict the *actual* change. Although it would complicate the analysis, it may be desirable to relax this assumption.

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[17] See George R. Morrison, *Liquidity Preferences of Commercial Banks*, Chicago: University of Chicago Press, 1966; Frank De Leeuw, "A Model of Financial Behavior," in *The Brookings Quarterly Econometric Model of the United States*, James Duesenberry, ed., Chicago: Rand McNally, 1965; and Richard G. Davis, "Testing Some Variants of the Free Reserve Hypothesis," *op. cit.* Morrison finds adjustment lags ranging from 7.5 to 27.6 months; De Leeuw, from 4.9 to 141.4 quarters, and Davis from 6.4 to 16.7 quarters. (For a contrary view, see William R. Bryan, "Commercial Banks and the 'Molasses World'," in a forthcoming issue of the *American Economic Review*. See also D. I. Fand and J. E. Tower, "An Analysis of the Money Supply Process in Canada," in a forthcoming issue of *The Canadian Journal of Economics and Political Science*.)

► GEORGE G. KAUFMAN

Indicators of Monetary Policy: Theory and Evidence

There is disagreement and confusion among economists concerning appropriate indicators of monetary policy. This confusion relates both to the theoretical role of an indicator, and the best empirical indicator of monetary policy.[1] This paper briefly sketches the theory of policy indicators, distinguishes between indicators and intermediate targets, and reports on some relatively simple and preliminary tests to differentiate among alternative indicators.

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I. The Theory

Indicators may be defined as economic variables which measure the contribution of specific economic policies to their ultimate targets, apart from other forces affecting these targets at the same time. The thrust of economic policy must be identifiable in order to formulate, describe, and evaluate policy systematically.

[1] The indicator problem was first called to the author's attention by Karl Brunner and Allan H. Meltzer. Much of the theoretical discussion in this paper is based on their work developed in two manuscripts: "Indicators and Targets of Monetary Policy," unpublished, 1964; and "The Meaning of Monetary Indicators" in *Monetary Process and Policy: A Symposium*, George Horwich, ed., Homewood, Illinois: Richard D. Irwin, 1967, pp. 187-217.

Because policy actions are undertaken to affect specific ultimate target variables, it would appear reasonable to use these variables as indicators of policy. However, this is not always appropriate, since the ultimate targets of monetary policy—production, employment and prices—are affected both by a large number of forces other than monetary policy and by monetary policy only after some time lag.

In a world of complete knowledge, in which all the interrelationships among economic variables were known with precision, there would be no limitations on the use of ultimate targets as indicators. But in the current state of economic knowledge, the interrelationships are only partially identified and the time lags only approximated. This study is directed primarily at constructing a framework within which alternative indicators of policy may be systematically evaluated on the basis of the present state of knowledge.

The thrust of monetary policy is typically measured by movements in either interest rates or aggregate monetary and credit measures.[2] However, these measures can emit conflicting signals.[3] In the early months of 1966, for example, both interest rates and aggregate monetary and credit series rose sharply, signaling greater restriction to readers of interest rate indicators and less restriction to readers of the aggregate measures. Similar differences appear in measuring the thrust of fiscal policy, depending on which of the four popular indicators of policy are read—the administrative budget, the cash budget, the national income budget, or the full employment budget.[4]

An optimal indicator, it may be argued, should be an important link in the transmission mechanism, reflect the contribution of the policy in question apart from all other forces affecting the target, and be frequently observable. To be of maximum aid to policy makers, the indicator should also be positioned close in the transmission sequence to the timing of the policy action, so that readings of current policy are permissible. This suggests, with respect to monetary policy, a financial variable primarily, if not solely, under the influence of the central bank, and only minimally, if at all, affected by feedback from the real sector in the same period.

The exact nature of the relationship between policy and the ultimate target need not be known. It is sufficient to know the direction of the relationship and that the parameters remain reasonably stable. For example, assuming stability in the relationship, one need only know whether $\frac{\partial Y}{\partial I}$ is positive or negative—where I is the indicator and Y is the prime ultimate target. It follows from this that the greater the change in the indicator in one direction, the stronger is policy in that direction, in that period relative to earlier periods. The indicator so defined signals only changes in the relative thrust of policy; it does not evaluate the appropriateness of the policy.

Nor is it necessary for an optimal indicator also to be an optimal intermediate target. Intermediate policy targets are used because the chain of causation from policy action to ultimate target is long and the speed of transmission of a policy

[2] Leonall C. Andersen and Jules M. Levine, "Implementation of Federal Reserve Open Market Policy in 1964," Federal Reserve Bank of St. Louis, *Review*, June 1965, pp. 1-9.

[3] For an excellent analysis of the reasons different monetary policy indicators may emit different signals, see Brunner and Meltzer, "The Meaning of Monetary Indicators," *op. cit.*, pp. 189-191.

[4] "The Federal Budget for 1963," Federal Reserve Bank of Chicago, *Business Conditions*, April 1962, pp. 11-16; Keith M. Carlson, "Budget Policy in a High Employment Economy," Federal Reserve Bank of St. Louis, *Review*, April 1966, pp. 6-13.

action along this chain is slow. The policy maker thus may find it useful to direct his actions at one or more variables closer in time to the immediate impact of policy than the ultimate targets. Unlike a policy indicator, however, the optimal intermediate target requires more complete knowledge of the linkage relationship from central bank to ultimate target. This is necessary in order for the policy maker to affect the ultimate target with substantial certainty at a later date by first achieving a specified change in the intermediate target. Also, unlike the criteria for indicators, the intermediate target need not reflect primarily the action of the central bank. Indeed, it is probable that optimal intermediate targets would be closely correlated with other, further out in time, intermediate or ultimate targets.[5]

Because the current state of economic knowledge permits more definite statements about the direction of relationships among variables than the values of the parameters, the selection of optimal indicators appears to be easier than the selection of optimal intermediate targets. The limited state of knowledge also may influence the designation of a variable as a target, an indicator, or both. This paper is limited to a consideration of variables as indicators only, a relatively restricted but not unimportant function.

[5] Failure to distinguish properly between the functions of indicators and intermediate targets can confuse the analysis of appropriate indicators and severely restrict the meaningfulness of the conclusions. For example, Gramley and Chase apparently fail to distinguish clearly between the two functions when they argue that because "the effect of these (central bank) actions on money income occurs not because the money stock has been altered, but because financial variables through which the central bank alters the desired stock of money also affect the public's decision to purchase goods and services . . . there remains no alternative but to search for indicators among the relevant financial variables that enter the expenditure functions—prices, yields and nonprice terms on financial assets." Lyle E. Gramley and Samuel B. Chase, Jr., "Time Deposits in Monetary Analysis," *Federal Reserve Bulletin*, LI, October 1965, pp. 1403-1404.

II. The Evidence

As argued above, an optimal indicator should satisfy five major criteria:

1. Important link in the transmission mechanism;
2. Primary influence by central bank;
3. Minimum feedback from real sector;
4. Frequent and timely availability;
5. Positioned near immediate central bank action.

A review of the literature suggests that three sets of financial variables are generally accepted as satisfying, about equally, the criteria of important link, frequent availability, and early positioning in the transmission sequence—(1) prices and yields of financial assets; (2) quantities of aggregate financial assets; and (3) bank-reserve-position measures. For the purposes of this paper, the first set of measures is broadly referred to as interest rates, and the second set as money-supply measures. Several of the more frequently specified indicator variables are considered here:

A. Interest rates
   1. Three-month Treasury bill yield (i_1)
   2. Long-term Treasury bond yield (i_2)

B. Money supply measures
   1. Narrow money (M_1)—currency, and demand deposits adjusted.
   2. Broad money (M_2)—currency, demand deposits adjusted, and time deposits at commercial banks.
   3. Liquid assets (M_3)—currency, demand deposits adjusted, time deposits at commercial banks, deposits at mutual savings banks, share capital at savings and loan associations, U. S. Government savings bonds, and non-

bank holdings of U. S. Government securities maturing within one year.

4. Bank credit (M_4).

C. Reserve position measures

1. Member bank borrowing from Federal Reserve banks (P_1).
2. Free reserves (P_2) — member bank excess reserves less borrowed reserves.

Interest rates and borrowings are most frequently believed to be inversely linked to the ultimate target variables, and money supply measures and free reserves directly linked. Hence, declining borrowings and rates of interest, and expanding free reserves and money supply measures, are generally interpreted as indicating greater monetary ease—while rising borrowing rates and contracting free reserves and money supply measures indicate a more restrictive monetary policy.

Multiple regression analysis may be used to distinguish the ability of alternative indicators to satisfy the other two criteria. Primary influence by the central bank implies a close correlation between the indicator and the variable best reflecting the immediate impact of central bank action. Minimum feedback from the real sector implies a low correlation between the indicator and variables reflecting real-sector pressures. When both central-bank actions and real-sector forces are specified in a single equation, these criteria imply that the optimal indicator will have a high partial correlation with central-bank actions and a low partial correlation with real-sector forces.

It may appear that the criterion of low correlation with real-sector forces is in conflict with the criterion of important link in the transmission sequence, which implies a close correlation with the ultimate target variables. There is, however, no conflict. Financial variables are generally considered to have their greatest impact on the real sector in future periods. The consensus among leading monetary economists places this time lag at between six and nine months.[6] The linkage relationship between the indicator and ultimate target may thus be written:

$$Y_{t+n} = g(I)_t,$$

and a high correlation in this equation is not inconsistent with a low correlation between Y_t and I_t. Even the signs may differ. The shorter the observation period, the smaller may be the expected influence of the indicator variable on the ultimate target in the same period.

At first approximation, central-bank actions and real-sector forces may each be captured in a single variable. The three major tools of monetary policy—open market operations, reserve requirements, and the discount rate—all have their initial impact on member bank reserves. The strategic role of reserves as the vehicle through which monetary actions are transmitted is described by the Federal Reserve as follows:

> The Federal Reserve carries out its responsibility for the public interest by influencing the reserves of member banks . . . . that is where the initial impact of reserve banking policy falls. As banks respond to changes in the availability of reserve funds by altering their lending and investment policies, reserve banking comes to influence the supply of money, the availability of credit, and the cost of money in various credit markets.[7]

Although all three tools of monetary control affect reserves, they do so differently. Open market operations and the discount rate affect the overall volume of reserves, while reserve requirements affect the mix of reserves between required and excess. The impact of the three tools on reserves may be made comparable, however, by adjusting reserves for changes in reserve

[6] U.S. Congress, House Committee on Banking and Currency, Hearings, *The Federal Reserve System After Fifty Years,* 2, 88th Congress, 2nd Session, 1964.

[7] Board of Governors of the Federal Reserve System, *The Federal Reserve System—Purposes and Functions,* Washington, D.C., 1963, p. 128.

requirements. All operations are then reflected in changes in the overall volume of reserves, and the three tools have in effect been reduced to resemble one instrument.[8]

Total reserves adjusted for changes in reserve requirements are also occasionally employed as indicators of policy. However, because no other single variable captures the net impact of all central-bank actions as competely, and since less is known about the relationship of reserves directly with the ultimate policy targets, reserves are specified in this study only as an effective instrument of policy actions. As a consequence, the tested indicators are selected from financial variables positioned somewhat further out in the transmission sequence.

Real sector forces are approximated by gross national product (quarterly) and industrial production (monthly). Thus: [9]

$$I_t = f(R, Y)_{t-n}, \qquad (1)$$

and in linear form:

$$I_t = a + b_1 R_{t-n} + b_2 Y_{t-n}, \qquad (2)$$

where:

I = the indicator

R = total member bank reserves adjusted for changes in reserve requirements

Y = GNP or industrial production[10]

And n takes values from 0 to α.

All variables in equation 2 except interest rates and reserve-position measures are seasonally adjusted and are in logarithmic terms; interest rates and reserve positions are in arithmetic magnitudes. Both level and first-difference regressions are estimated. Interest rates are also regressed on independent variables in earlier periods to capture any delayed relationships. Observations are both monthly and quarterly—periods sufficently brief to minimize the influence of the indicator variables on the real sector in the same period—for 1953 through 1966. The regressions are also fitted to a weighted moving average of monthly observations to reduce the influence of random disturbances on the series. To check the stability of the parameters through time, the regressions are estimated separately for the two subperiods 1953 through 1959, and 1960 through 1966, in addition to the full period.

Earlier arguments suggest positive coefficients for total reserves if money supply measures or free reserves are specified as the indicator in equation 2, negative coefficients if interest rates or borrowings are specified as indicators, and positive coefficients for income for all indicator measures but free reserves. The results are summarized in Tables 1 through 8 in the Appendix.

The evidence from both the level and first-difference regressions is quite clear. Although none of the measures tested satisfy completely the relatively simple criteria developed earlier for an optimal policy indicator, money supply measures are both more closely related to central bank actions and relatively less affected by feedback from the real sector than either interest rates or reserve-position measures. As expected, total reserves are positively related to money-supply measures and free reserves, and are inversely related to interest rates and borrowings. The absolute values of the partial-cor-

[8] Although adjusted for changes in reserve requirements, total reserves are not adjusted for changes in deposit mix. This may result in a change in the slope of the trend over the long run if changes in deposit mix are very great. I am thankful for this point to Lawrence Butler.

[9] Although reserves and income are interrelated, reserves are generally postulated, as noted, to have their major impact on income some six to nine months afterwards, so that both variables may be specified as independent variables if the observation periods are selected short relative to the estimated impact time lag.

[10] Industrial production is multiplied by the wholesale price index less the food component to transform the series to nominal magnitudes.

relation coefficients, however, are on the whole greater between reserves and money-supply measures than between reserves and interest rates or reserve positions. Moreover, with infrequent exception, the partial correlation coefficients between reserves and money-supply measures are greater than between these measures and real sector forces, while both interest rates and reserve positions are generally more closely associated with real sector forces than with total bank reserves.

Among the money supply measures, a relative ordering reveals that bank credit satisfies the criteria best, and liquid assets worst. The relative superiority of bank credit is particularly evident for first-difference observations. The partial correlation coefficient between the level of bank credit and the level of reserves varies from close to the same size to twice as great as the coefficient between the level of bank credit and the level of aggregate output, and the partial correlation between first differences in bank credit and reserves is four to five times as large as between changes in bank credit and changes in output. These findings remain unchanged for the two subperiods, and when the indicator is progressively lagged behind reserves and income. As might be expected, the value of first-difference indicators fades rapidly as the indicator is related to reserves in earlier periods.

The ability of bank credit to satisfy best the criteria for an optimal indicator is not difficult to understand. Banks typically operate with a minimum amount of nonearning assets in excess of the amounts legally required. Because there exists a large variety of investments which banks may make quickly and at little cost, it may be expected that they will react promptly to central bank actions increasing the volume of reserves. Likewise, banks may be expected to contract earning assets quickly, particularly those which can be sold at little cost, when central bank actions contract reserves below legally-required levels. Aggregate levels of bank credit thus appear to be more under the control of the commercial banks than either measure of the money supply, which is in greater degree subject to the preferences of the public. In addition, since there has been an ample supply of liquid investments in the postwar years, the ability of banks to be fully invested at all times—although not the mix of earning assets—has been independent of changes in aggregate income.

Neither is it surprising that interest rates or reserve-position measures, which move in close harmony with rates, are inferior indicators of monetary policy. Recent investigation has found rates to be affected by real-sector forces more closely, to a greater degree, and for a longer period of time than by monetary forces.[11] Moreover, it appears no more reasonable to gauge the thrust of monetary policy by interest rates than to use these rates to measure the thrust of fiscal, debt or any other economic policy affecting aggregate levels of output, employment, and prices.

These findings offer little hope that observers who reject money-supply measures because they are imperfect indicators will be any less frustrated in their search for more reliable indicators among interest-rate or reserve-position variables. Moreover, the empirical evidence contradicts the argument that:

> The existence of time deposits and other classes of bank liabilities that substitute for securities loosens the link between central bank actions and money, making the money stock an untrustworthy indicator of the effects of policy actions on financial asset prices and yields. The at-

[11] William E. Gibson and George G. Kaufman, *The Relative Impact of Money and Income on Interest Rates: An Empirical Investigation,* Staff Economic Studies 26, Washington: Board of Governors of the Federal Reserve System, 1967.

tractive simplicity of the money-stock guide to central bank policy cannot be salvaged by redefining the money stock to include other classes of bank liabilities, however. Variable rates of return on bank deposits make simple rules of growth in money, regardless of how money is defined, unsuitable guidelines for the conduct of monetary policy.[12]

The conclusion that interest rates are untrustworthy indicators of the thrust of monetary policy should not be interpreted to reflect on their usefulness as intermediate targets of policy. As noted previously, variables need not satisfy equally the criteria for both functions and, given their key role in linking the financial and real sectors, interest rates may well perform as superior intermediate targets.

Although bank credit satisfied best the criteria developed in this paper for an optimal indicator of monetary policy in a world of imperfect knowledge, the results should be interpreted as marking a beginning not an end to the search for indicators of policy. Levels of bank credit are importantly affected by real sector forces, and changes in bank credit are not always highly correlated with changes in reserves. These limited results undoubtedly reflect at least in part the relatively crude criteria developed, the relatively simple tests applied, and the limited number of indicator variables tested. In addition, the three major assumptions underlying the analysis—(1) that the indicator variables are important links in the transmission sequence, (2) reasonable stability in the relationship between the indicator variables and the ultimate targets, and (3) a lag of at least one month between changes in the indicator variables and their impact on income—although reasonable, urgently require further empirical exploration. Nevertheless, the findings leave little doubt that quantities of financial assets, particularly commercial bank assets, reflect central bank actions to a considerably greater extent than do either the prices and yields of such assets or measures of reserve positions. As a result, a statement describing the thrust of monetary policy in terms of relative changes in aggregate measures of financial assets may be made with greater confidence that at least the direction of the contribution of monetary policy to the ultimate target variables is correctly identified.

[12] Gramley and Chase, *op. cit.*, pp. 1403-1404.

Statistical Appendix

TABLE 1

Partial Correlation Coefficients, Indicator, Reserves, and Industrial Production † Monthly, 1953-1966

	1953-1966			1953-1959			1960-1966		
Indicator	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.86*	.66*	.988	.95*	.90*	.981	.73*	.79*	.991
M_2	.96*	.56*	.996	.93*	.61*	.959	.93*	.58*	.995
M_3	.88*	.66*	.990	.84*	.66*	.924	.89*	.49*	.992
M_4	.94*	.63*	.994	.95*	.65*	.970	.95*	.46*	.996
i_1	−.62*	.81*	.844	−.66*	.90*	.849	−.58*	.79*	.883
i_2	−.36*	.73*	.864	−.30*	.71*	.783	−.68*	.82*	.865
P_1	−.56*	.53*	.316	−.72*	.81*	.657	−.71*	.78*	.717
P_2	.56*	−.59*	.350	.69*	−.84*	.707	.69*	−.79*	.785
Lag 1									
M_1	.88*	.61*	.988	.95*	.87*	.980	.76*	.72*	.990
M_2	.96*	.50*	.995	.93*	.55*	.954	.94*	.44*	.995
M_3	.88*	.66*	.990	.85*	.67*	.926	.90*	.36*	.991
M_4	.94*	.57*	.993	.95*	.57*	.966	.95*	.32*	.996
i_1	−.56*	.78*	.828	−.56*	.89*	.840	−.48*	.78*	.912
i_2	−.33*	.72*	.861	.38*	.70*	.795	−.61*	.79*	.869
P_1	−.51*	.48*	.263	−.64*	.78*	.617	−.68*	.78*	.752
P_2	.50*	−.53*	.291	.57*	−.80*	.665	.61*	−.76*	.788

† Industrial production is multiplied by the wholesale price index less the food component.
* Corresponding regression coefficients are significant at the .05 level.

TABLE 2

Partial Correlation Coefficients, Indicator, Reserves, and Industrial Production † First Differences, Monthly, 1953-1966

	1953-1966			1953-1959			1960-1966		
Indicator	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.30*	.19*	.123	.35*	.27*	.182	.24*	.09	.070
M_2	.36*	.08	.140	.40*	.06	.162	.31*	.10	.112
M_3	.16*	.16*	.052	.06	.16	.029	.25*	.18	.095
M_4	.48*	.10	.244	.49*	.10	.252	.43*	.08	.195
i_1	−.14	.36*	.140	.30*	.44*	.250	.14	.20	.062
i_2	.01	.38*	.142	−.04	.45*	.198	.14	.23*	.074
P_1	−.01	.28*	.077	−.12	.29*	.095	.27*	.22*	.123
P_2	.22*	−.28*	.117	.26*	−.29*	.137	.12	−.27*	.080
Lag 1									
M_1	.04	.20*	.044	.01	.28*	.079	.02	.22*	.048
M_2	.15	.05	.025	.10	.04	.011	.10	.16	.037
M_3	−.01	.29*	.082	−.14	.41*	.177	.07	.16	.034
M_4	.40*	.01	.164	.43*	−.04	.182	.30*	.17	.119
i_1	−.08	.25*	.068	−.18	.36*	.147	.07	.14	.026
i_2	−.05	.26*	.069	−.04	.29*	.085	−.02	.16	.026
P_1	.05	.21*	.048	.05	.24*	.061	.03	.16	.026
P_2	−.13	−.20*	.060	−.12	−.25*	.079	−.16	−.12	.042

† Industrial production is multiplied by the wholesale price index less the food component.
* Corresponding regression coefficients are significant at the .05 level.

TABLE 3

Partial Correlation Coefficients, Indicator, Reserves, and Industrial Production † Monthly, 1953-1966 ‡

Indicator	1953-1966			1953-1959			1960-1966		
	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.86*	.66*	.989	.97*	.92*	.987	.72*	.81*	.992
M_2	.97*	.58*	.997	.95*	.62*	.968	.95*	.57*	.996
M_3	.88*	.66*	.990	.86*	.66*	.933	.90*	.45*	.993
M_4	.95*	.63*	.995	.96*	.68*	.978	.96*	.40*	.997
i_1	−.65*	.82*	.858	−.71*	.92*	.874	−.63*	.80*	.872
i_2	−.38*	.74*	.871	.31*	.71*	.790	−.75*	.86*	.888
P_1	−.56*	.52*	.316	−.74*	.81*	.654	−.76*	.82*	.739
P_2	.56*	−.59*	.343	.72*	−.84*	.713	.75*	−.82*	.799
Lag 1									
M_1	.89*	.61*	.989	.97*	.91*	.988	.76*	.73*	.991
M_2	.97*	.51*	.997	.95*	.56*	.965	.95*	.40*	.996
M_3	.98*	.66*	.990	.87*	.67*	.937	.91*	.31*	.993
M_4	.94*	.58*	.994	.96*	.59*	.975	.97*	.21	.997
i_1	−.59*	.80*	.844	−.65*	.92*	.876	−.54*	.78*	.894
i_2	−.35*	.73*	.868	.38*	.71*	.807	−.68*	.82*	.879
P_1	−.51*	.48*	.269	−.67*	.79*	.625	−.73*	.81*	.758
P_2	.51*	−.54*	.296	.63*	−.82*	.687	.70*	−.80*	.804

† Industrial production is multiplied by the wholesale price index less the food component.
‡ Weighted moving average with current month weighted 2 and the two preceding months 1.
* Corresponding regression coefficients are significant at the .05 level.

TABLE 4

Partial Correlation Coefficients, Indicator, Reserves, and Industrial Production † First Differences, Monthly, 1953-1966 ‡

Indicator	1953-1966			1953-1959			1960-1966		
	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.44*	.38*	.282	.42*	.52*	.357	.45*	.21	.231
M_2	.52*	.16*	.285	.53*	.17	.292	.50*	.13	.256
M_3	.18*	.27*	.098	−.06	.28*	.081	.34*	.26*	.165
M_4	.70*	.16*	.496	.72*	.15	.518	.64*	.11	.409
i_1	−.25*	.49*	.281	−.48*	.58*	.460	.23*	.33*	.151
i_2	−.08	.55*	.302	−.15	.63*	.408	.12	.38*	.158
P_1	−.04	.42*	.178	−.19	.43*	.218	.36*	.38*	.242
P_2	.18*	−.44*	.214	.28*	−.44*	.257	−.09	−.42*	.178
Lag 1									
M_1	.37*	.31*	.207	.34*	.49*	.301	.37*	.15	.152
M_2	.46*	.08	.214	.44*	.08	.194	.42*	.05	.176
M_3	.12	.30*	.102	−.14	.43*	.205	.27*	.13	.084
M_4	.67*	.02	.452	.69*	−.04	.474	.60*	.10	.359
i_1	−.13	.43*	.202	−.28*	.56*	.361	.20	.14	.057
i_2	−.01	.50*	.252	−.02	.58*	.343	.12	.31*	.106
P_1	.14	.42*	.184	.07	.45*	.204	.32*	.31*	.179
P_2	−.14	−.43*	.192	−.09	−.47*	.219	−.29*	−.34*	.179

† Industrial production is multiplied by the wholesale price index less the food component.
‡ Weighted moving average with current month weighted 2 and the two preceding months 1.
* Corresponding regression coefficients are significant at the .05 level.

TABLE 5

Partial Correlation Coefficients, Indicator, Reserves, and Industrial Production † Quarterly, 1953-1966

	1953-1966			1953-1959			1960-1966		
Indicator	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.86*	.67*	.989	.97*	.93*	.988	.75*	.81*	.992
M_2	.97*	.58*	.997	.95*	.62*	.968	.95*	.59*	.997
M_3	.98*	.66*	.991	.86*	.67*	.934	.91*	.48*	.993
M_4	.95*	.63*	.995	.96*	.68*	.978	.96*	.46*	.997
i_1	−.65*	.83*	.867	−.70*	.92*	.882	−.75*	.89*	.935
i_2	−.38*	.74*	.871	.31	.71*	.795	−.75*	.86*	.898
P_1	−.58*	.55*	.338	−.77*	.85*	.718	−.76*	.82*	.767
P_2	.58*	−.61*	.373	.75*	−.88*	.774	.73*	−.82*	.819
Lag 1									
M_1	.91*	.44*	.990	.97*	.80*	.984	.79*	.53*	.988
M_2	.97*	.35*	.995	.93*	.42*	.951	.95*	.04	.996
M_3	.89*	.65*	.990	.89*	.71*	.945	.92*	.01	.993
M_4	.93*	.46*	.992	.94*	.41*	.955	.97*	−.14	.997
i_1	−.37*	.68*	.800	−.26	.85*	.825	−.34	.82*	.963
i_2	−.23	.66*	.849	.56*	.67*	.830	−.43*	.70*	.862
P_1	−.40*	.38*	.161	−.44*	.74*	.599	−.68*	.82*	.865
P_2	.37*	−.43*	.205	.33	−.77*	.681	.53*	−.76*	.878

† Industrial production is multiplied by the wholesale price index less the food component.
* Corresponding regression coefficients are significant at the .05 level.

TABLE 6

Partial Correlation Coefficients, Indicator, Reserves, and Industrial Production † First Differences, Quarterly, 1953-1966

	1953-1966			1953-1959			1960-1966		
Indicator	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.55*	.47*	.409	.50*	.64*	.487	.64*	.31	.427
M_2	.63*	.22	.410	.61*	.26	.383	.66*	.15	.432
M_3	.23	.33*	.142	−.17	.37*	.166	.47*	.32	.268
M_4	.86*	.25	.744	.89*	.24	.791	.82*	.20	.673
i_1	−.36*	.59*	.419	−.59*	.72*	.636	.13	.36	.138
i_2	−.22	.64*	.429	−.29	.76*	.600	.00	.42*	.176
P_1	−.01	.52*	.271	−.19	.54*	.319	.46*	.52*	.367
P_2	.07	−.57*	.334	.24	−.58*	.379	−.39*	−.60*	.409
Lag 1									
M_1	.49*	.21	.261	.48*	.29	.267	.38*	.05	.143
M_2	.58*	−.05	.342	.47*	−.25	.278	.56*	−.08	.332
M_3	.30*	.32*	.167	−.09	.55*	.310	.43*	−.08	.197
M_4	.52*	−.17	.290	.32	−.38	.238	.61*	.08	.378
i_1	.32*	.48*	.280	.28	.60*	.375	.54*	.12	.293
i_2	.34*	.42*	.246	.41*	.51*	.336	.49*	.39*	.305
P_1	.50*	.53*	.402	.49*	.58*	.434	.63*	.40*	.438
P_2	−.49*	−.57*	.427	−.54*	−.65*	.509	−.51*	−.36	.311

† Industrial production is multiplied by the wholesale price index less the food component.
* Corresponding regression coefficients are significant at the .05 level.

TABLE 7

Partial Correlation Coefficients, Indicator, Reserves, and Gross National Product, Quarterly, 1953-1966

	1953-1966			1953-1959			1960-1966		
Indicator	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.75*	.40*	.984	.76*	.87*	.979	.17	.67*	.988
M_2	.95*	.63*	.997	.89*	.86*	.986	.81*	.79*	.998
M_3	.82*	.89*	.996	.58*	.87*	.972	.63*	.73*	.996
M_4	.95*	.92*	.999	.94*	.90*	.993	.88*	.73*	.998
i_1	−.39*	.59*	.725	−.84*	.92*	.870	−.75*	.82*	.903
i_2	−.72*	.86*	.927	−.41*	.82*	.866	−.66*	.74*	.820
P_1	−.20	.16	.077	−.72*	.75*	.560	−.60*	.65*	.586
P_2	.23	−.24	.062	.71*	−.78*	.624	.62*	−.68*	.702
Lag 1									
M_1	.85*	.23	.988	.90*	.78*	.982	.30	.49*	.988
M_2	.94*	.55*	.996	.84*	.73*	.973	.78*	.39*	.996
M_3	.85*	.89*	.997	.70*	.90*	.979	.63*	.42*	.994
M_4	.90*	.82*	.996	.86*	.72*	.974	.85*	.25	.997
i_1	−.11	.38*	.679	−.38*	.69*	.660	−.52*	.71*	.945
i_2	−.54*	.77*	.891	−.03	.73*	.857	−.35	.49*	.795
P_1	.01	−.04	.019	−.31	.48*	.309	−.53*	.62*	.750
P_2	.00	−.03	.029	.27	−.52*	.424	.56*	−.66*	.838

* Corresponding regression coefficients are significant at the .05 level.

TABLE 8

Partial Correlation Coefficients, Indicator, Reserves, and Gross National Product, First Differences, Quarterly, 1953-1966

	1953-1966			1953-1959			1960-1966		
Indicator	R	Y	R^2	R	Y	R^2	R	Y	R^2
M_1	.56*	.52*	.443	.53*	.67*	.517	.65*	.38*	.459
M_2	.65*	.35*	.455	.62*	.34	.416	.67*	.29	.466
M_3	.23	.38*	.177	−.16	.30	.120	.50*	.46*	.358
M_4	.87*	.35*	.761	.90*	.33	.803	.82*	.25	.681
i_1	−.37*	.61*	.437	−.56*	.69*	.610	.15	.51*	.268
i_2	−.23	.61*	.400	−.26	.73*	.564	−.01	.46*	.211
P_1	−.02	.55*	.300	−.17	.58*	.362	.45*	.51*	.361
P_2	.08	−.60*	.364	.22	−.63*	.436	−.36	−.56*	.367
Lag 1									
M_1	.50*	.28*	.289	.49*	.35	.295	.39*	.20	.175
M_2	.59*	.08	.345	.47*	−.15	.249	.57*	.07	.331
M_3	.30*	.39*	.214	−.09	.51*	.277	.45*	.15	.211
M_4	.52*	−.08	.273	.32	−.30	.194	.62*	.11	.381
i_1	.31*	.49*	.292	.30	.63*	.417	.54*	.19	.309
i_2	.34*	.49*	.307	.48*	.66*	.490	.46*	.35	.285
P_1	.48*	.51*	.391	.51*	.62*	.472	.60*	.29	.389
P_2	−.48*	−.58*	.438	−.57*	−.70*	.562	−.49*	−.36	.312

* Corresponding regression coefficients are significant at the .05 level.

►H. H. BINHAMMER

Canada's Revised Banking Legislation

In Canada, there are three basic pieces of banking legislation, all at the Federal level: (1) the Bank of Canada Act which established the central bank in 1934; (2) the Bank Act which applies to the 10 chartered or commercial banks specified in the Act and any others chartered in the future; and (3) the Quebec Savings Bank Act which applies to Canada's two savings banks, both in the Province of Quebec. The two latter acts have a life of 10 years and provide the legal framework and charters for Canadian banks.

In the British North America Act that established the Canadian Confederation in 1867, jurisdiction over the incorporation of banks and banking was given to the Federal government. However, inso-far as this Act does not define banks or banking, it has inhibited the extension of national control to near banks.

Decennial renewal of Canadian banking legislation has existed since shortly after Confederation.[1] The latest decennial renewal has inspired an especially hard look not only at banks and banking but at the entire Canadian financial structure. This was begun in October 1961

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[1] After reviewing the revisions to the bank acts, the Parliamentary Committee noted that it "recognizes the value of regular, complete decennial revisions . . . but believes these should not prevent this committee carrying out special studies on subjects related to the Acts and amendments being made to them from time to time if such should become necessary in the interval." *Standing Committee on Finance, Trade and Economic Affairs, Minutes of Proceedings and Evidence*, No. 53, February 2, 1967, p. 3592.

with the appointment of the Royal Commission on Banking and Finance, now known as the Porter Commission.[2] The only other similar approach to decennial renewal was in 1933 under the Macmillan Commission, which led to the establishment of the central bank in 1934. The Porter Report, some 30 years later, is leading to changes in the structure and operation of Canada's financial system as dramatic as those which followed the Macmillan Report.

The Porter Commission, after a thorough and careful examination, diagnosed Canada's financial system as being in relatively good health, but suggested that banks needed to become more competitive, more flexible, and more adventurous. The Government has, by and large, followed fairly closely in the revised legislation the prescriptions of the Commission. The legislation attempts to do two things: (1) to *allow* banks to be more competitive, and (2) to *ensure* that they will be more competitive.[3]

I. New Provisions To Allow Banking Competition

A. New Sources of Cash

The amendments to the Bank Act allow banks, for the first time, to obtain additional cash by selling unsecured indebtedness, that is, bank debentures. Bank debentures must carry maturities of at least five years, and are not to be callable during the first five years after issue. Moreover, they are to be subordinate in right of payment to the prior payment in full of the deposit liabilities of a bank and such other liabilities as may be mentioned in the instruments. The aggregate principal amount of debentures that a bank may have outstanding after 1970 is limited to an amount equal to 50 percent of the total of its paid-up capital and rest account.[4]

Another source of additional cash for banks will be the sale of shares. Traditionally, Canadian banks have had to issue new stock with pre-emptive rights and with a specified par value, reduced in 1944 from $100 to $10 a share. Before 1954, banks were reluctant to offer new shares because this meant offering them to nonresident holders in countries, particularly the United States, where securities exchange regulations required public disclosure of information which in Canada was given only to the Government. The Bank Act revisions of 1954 no longer

[2] See *Report of the Royal Commission on Banking and Finance*, Ottawa: The Queen's Printer, 1964. For a review of the report, see J. F. Chant, "The Porter Commission on Canadian Banking and Finance," *Quarterly Review of the Banca Nazionale del Lavora*, June 1965; David W. Slater, "The Report of the Royal Commission on Banking and Finance," *Canadian Journal of Economics and Political Science*, August 1965; Herbert Stein, "Report of the Royal Commission on Banking and Finance, 1964: Review Article," *The Journal of Political Economy*, June 1966; F. H. Schott, "Report of the Canadian Royal Commission on Banking and Finance: A Review," *Monthly Review of the Federal Reserve Bank of New York*, August 1964.

[3] This paper does not deal separately with the Quebec Savings Bank Act which closely parallels the Bank Act. Its main difference is in the strict limits it imposes on the savings banks' investment power, which precludes them from commercial banking and ensures the safety of their deposits. The cash and secondary reserve requirements of the savings banks also differ from those of the chartered banks. The savings banks have to hold an average monthly minimum cash reserve in the form of notes of the Bank of Canada or of a chartered bank equal to 5 percent of their deposits. In addition, they are required to hold an average monthly minimum secondary reserve equal to 15 percent of their deposits. Secondary reserves may include notes of and deposits with the Bank of Canada, deposits with a chartered bank, and securities issued or guaranteed by the Federal or provincial governments.

[4] Banks chartered either five years before or after October 31, 1965 must determine their maximum debenture issue on the basis of a formula specified in the Act, which allows them a smaller proportionate amount of debentures depending upon the number of financial years since their charter.

required banks to offer their shares to nonresidents where such offers entailed more public disclosure than is necessary under Canadian law. The current legislative revisions remove yet another obstacle to the issue of new bank stock. Banks are now allowed to divide their authorized capital, which can be no less than $1 million, into shares having a par value of one dollar or multiples thereof not exceeding $10. This new ability to split their stocks within fairly broad limits opens up a potential source of extra cash for Canadian banks.

One of the banks' major complaints was their inability to compete with near banks for cash deposits, which resulted from the interest-rate ceiling on their loans. With the new provisions to increase the interest-rate ceiling and the eventual abandonment of this ceiling, banks can earn more on their loans and therefore pay a higher rate to attract cash deposits.

Moreover, banks now have more cash for lending operations, since the new legislation allows them to hold a smaller proportion of cash reserves against total deposit liabilities. In 1954, the required cash reserve ratio was increased from 5 to 8 percent, the first change since the establishment of the central bank in 1934, and the basis of calculating the ratio was changed from a daily to a monthly average. Now, following American practice, reserve requirements are calculated separately for demand and time deposits. The minimum cash reserve ratio against demand deposits, after specified monthly increases, will be set at 12 percent by February 1968, and following the same formula the ratio for time deposits will be reduced and set at 4 percent. Given the present distribution of the banks' holdings of demand and time deposits, there will be a reduction in overall cash-reserve requirements from 8 to around 6.6 percent. The Government did not respond to the banks' request to include vault cash, other than Bank of Canada notes, to satisfy cash requirements, and it only postponed a new basis for calculating such requirements to which the banks objected. After May 1968, at the discretion of the Bank of Canada, banks may be required to average their reserves twice, rather than only once, monthly.

B. New Lending Opportunities

In the past, particularly during postwar inflationary periods, the big stumbling block to the Canadian banks' earning ability was the statutory 6 percent ceiling on their loans. Through the use of compensating balances and service charges, the banks eventually circumvented this legislative restriction. Under the recent Bank Act revisions, the interest-rate ceiling was raised from 6 to 7¼ percent after May 1 for the remainder of 1967. Thereafter, provided that during any three-month period after December 31, 1966 the average market yield on short-term Government of Canada bonds does not fall below 5 percent, the ceiling is to be determined by the yield on these bonds. According to the legislative provisions, the ceiling is to be set and remain for each six-month period starting in January 1967 at 1¾ percent above the average market yield on short-term Canada bonds during a previous three-month period ending one month prior to each six-month interest-rate period. This provision was designed to allow for a transition period before the eventual abandoning of the ceiling. However, since during the first three months of 1967 the average market yield on short-term Canada bonds fell below the 5 percent "trigger rate," the transition period anticipated by the Government no longer applies and the ceiling will no longer exist after January 1968.

After the decennial revision of 1954, banks were permitted to make insured residential mortgage loans under the National Housing Act. The principal reason at that time for allowing banks to take hitherto traditionally-forbidden mortgage security was to alleviate a shortage of

residential mortgage funds. At first, banks entered the NHA mortgage field with some reluctance, but later they became important participants. However, in 1959, and thereafter, when the maximum rate of interest allowed on NHA loans exceeded the 6 percent legal ceiling on bank lending rates, banks withdrew virtually completely from NHA lending rather than get involved in the rationing of such loans. The recent revision of the Bank Act allows banks to take NHA mortgages at current market rates. Moreover, they are now allowed to make conventional mortgage loans as long as the amount of each loan is no more than 75 percent of the value of the property securing the loan. In its first financial year completed after October 31, 1965, a bank's holdings of all types of residential mortgage loans is restricted to an amount equal to 3 percent of its deposit liabilities plus its debentures. This percentage increases by one point with each additional financial year completed until it reaches the upper limit of 10 percent. The Government included this formula in its legislation in order to ensure that the entrance of banks into the residential mortgage loan market would not disrupt this market.[5]

Until the mid-1950's, Canadian banks made few personal loans for the purchase of consumer goods or to cover personal debts and services. This was the result of the banks' general policy of making self-liquidating loans (the real-bills approach), and their inability to accept satisfactory collateral and to charge more than 6 percent interest. The 1954 Bank Act amendments allowed banks for the first time to make loans to individuals on the security of chattel mortgages issued against household property, which included "motor vehicles and any personal or moveable property for use in or about dwellings." At the same time, in a statement by the Inspector General of Banks, implied approval was given to discount-type loans. This meant, for example, that although a bank could charge a maximum stated rate of only 6 percent, a 6 percent discount on a one-year amortized loan would yield an effective interest rate of 11.78 percent. These changes, along with the record of success of American banks with consumer loans, induced Canadian banks to adopt a new and vigorous approach to such loans.

Although banks were permitted to take chattel mortgages from householders, they were not allowed to accept mortgage collateral for their general business loans. This restriction has been removed under the 1967 amendments. As a result, banks will be able to supplement their hitherto real-bills approach by financing business fixed-capital expansion and by providing working capital secured by property. The only restriction on banks is that any one mortgage loan or advance may not be for more than 75 percent of the value of the property securing it.[6]

II. New Provisions To Ensure Banking Competition

A. Interlocking Directorships

In the Canadian financial system interlocking directorships have been a way of life, in no small part because of the hitherto restrictive banking legislation.[7] As far as the banks are concerned this is to

[5] The formula applies only to banks incorporated before May 1, 1967. Banks incorporated after that date are allowed to hold an amount of mortgage loans equal to 3 percent at the end of their first financial year, and this increases by one percentage point with the completion of each financial year until an upper limit equal to 10 percent is reached. This provision was presumably added in order to ensure the liquidity of new banks.

[6] This does not apply to NHA mortgages discussed earlier, or to corporation securities that are secured on any property.

[7] See R. C. McIvor, "Directorate Relationships Among Selected Financial Intermediaries," *Royal Commission on Banking and Finance, Appendix Volume,* Ottawa: Queen's Printer, 1964.

come to an end. The new legislation does not allow a director of a bank also to be a director of one of the Quebec savings banks or of a trust or loan corporation. Moreover, two years from the time the interest rate ceiling on bank loans is completely removed, a bank director may not also sit on the board of another Company which holds more than 10 percent of the voting shares of one of the Quebec savings banks or a trust or loan corporation. Furthermore, after July 1, 1971, with only a few minor exceptions, the directors of a bank may not constitute more than one-fifth of the board of directors of any other corporation.[8] The provision that the majority of the directors of a bank must be "subjects of Her Majesty ordinarily resident in Canada" has been replaced by the provision that "at least three-quarters of the directors shall be Canadian citizens ordinarily resident in Canada." Moreover, a person is ineligible for election or appointment as director of a bank if he is over the age of 75, or is a director of another bank.

B. Bank Ownership

The new spirit of bank independence is also reflected in the provisions concerning bank ownership. No one shareholder alone or in association with others, as defined in the Act, will be allowed to hold more than 10 percent of the voting shares of a bank. However, insofar as the Government believes that a large shareholding by one interest is desirable for a new bank, new banks with the prior approval of the Government may be allowed to issue more than 10 percent of their stock to any one resident shareholder. Governments, as well as an official or corporation administering, managing or investing any fund established to provide hospitalization, medical care, annuity, pension or similar benefits to particular classes of individuals, are excluded from owning voting shares of a bank.

The most contentious part of the new legislation proved to be the requirement that after December 1972 a bank may not have outstanding total liabilities (including paid-up capital, rest account and undivided profits) exceeding 20 times its authorized capital stock, if more than 25 percent of its issued shares are held by any one resident or nonresident and his associates. This provision restricts growth of the Bank of Western Canada as long as the present distribution of its shares is maintained, and makes it necessary for the Mercantile Bank of Canada to come under Canadian control.[9] In 1953, the Handels Bank of Rotterdam, Holland, obtained a charter for the Mercantile Bank of Canada as a wholly-owned subsidiary, and subsequently sold it to the First National City Bank of New York. At that time, the Government looked with favor upon foreign-owned banks in Canada because it thought that Canada should have more banks, and because it was doubtful that a Canadian group could put together the capital and the organization necessary to start and promote a new bank. Since then, two new Canadian banks have been chartered, The Bank of Western Canada and the Bank of British Columbia, and the Government has taken a firm stand against the ownership of Canadian banks by foreign interests. The First National City Bank of New York must reduce its holdings in the Mercantile Bank to 25 percent by December 31, 1972, and at a rate which may be specified by the Canadian government.

The new legislation not only restricts

[8] Excluded are corporations controlled by a bank, a bank service corporation as defined in the Act, and religious, educational, cultural, social, welfare, philanthropic or charitable corporations.

[9] More than 50 percent of the voting stock of the Bank of Western Canada is held by British International Finance (Canada) Ltd. and the York Lambton Financial Corporation (formerly Wellington Financial Corporation).

the ownership of a bank, but also a bank's holdings of the voting shares of other corporations. A bank is not allowed to hold more than 10 percent of the voting stock of any one Canadian trust or loan corporation or of any other Canadian corporation if its total investment in any such corporation is more than $5 million. Where the cost of acquisition of the voting stock by a bank or a corporation other than a trust or loan corporation is less than $5 million, it may hold up to 50 percent of the voting shares. This provision was added in order to allow banks to retain, but not to increase, their interest in such corporations as Roy Nat and Kinross. Since the late fifties and early sixties, these corporations have been set up as vehicles for banks to provide intermediate and long-term finance secured by mortgage collateral, and thus circumvent the restrictions in the Bank Act. Excluded from the limitations on shareholding in other corporations is the Export Finance Corporation of Canada, a corporation established by the banks in 1961 to facilitate medium-term export credit for Canadian companies. Also excluded are shareholdings in bank service corporations, such as real estate companies which own a bank's buildings. The Act prevents a bank from evading the shareholding requirements by holding stock of a foreign corporation which in turn may hold a substantial amount of the voting shares of a Canadian company. To ensure that the strict spirit of the legislation is respected, if, in the opinion of the Government, a bank, while meeting the stockholding requirements specified in the Act, still is able to exercise, directly or indirectly, effective control of a trust or loan corporation, the Government may order it to reduce its stockholdings below the percentage requirements set out in the Act.[10]

[10] If a bank holds voting shares in excess of the amounts prescribed in the Act, any excess must be disposed of before July 1, 1971. If non-voting shares held by a bank acquire voting rights, and as a result, a bank holds an excess amount, it is allowed two years to rid itself of the excess. A bank that acquires an excess amount of shares through the realization of security for any of its loans or advances is allowed five years to dispose of the excess. A bank is allowed to acquire more than 10 percent of the shares of a Canadian corporation in order to protect it from take-over, but it may hold any excess for only two years. In all these cases, where a bank holds an amount of voting shares in excess of that specified, the Minister of Finance may extend the time allowed by a bank to dispose of the excess shares, for a period not exceeding two years.

III. Further New Provisions in the Bank Act

The amended Bank Act prohibits agreements between banks on interest rates for both bank loans and deposits. It also requires banks to disclose the cost of borrowing from them, expressed as a rate per annum and an amount in dollars. This follows the legislation recently passed by most provinces requiring the disclosure of borrowing costs on other than bank loans.

Canadian banks, following British tradition, have been allowed annual pre-tax appropriations to reserves which have been disclosed to the Government but not to their shareholders. Such annual appropriations must now be made public. Moreover, banks must be more specific in most of their financial accounting to the Government and to their shareholders. This will allow for the first time public scrutiny of the efficiency of Canadian banks.

IV. Legislative Changes and Monetary Policy

A. Responsibility for Policy

The controversy during 1960 and 1961 between Mr. James Coyne, the then Governor of the Bank of Canada, and the Government over, among other things, monetary policy, pointed to the necessity

for defining not only where the ultimate responsibility for policy decisions should rest, but also the relationship between the Governor of the Bank and the Minister of Finance. The revised Bank of Canada Act specifies that the Minister of Finance and the Governor "shall consult regularly on monetary policy and on its relations to general economic policy." When, after consultation, differences between the Minister and the Governor remain unresolved, the Minister may with the approval of the Cabinet "give to the Governor a written directive concerning monetary policy, in specific terms and applicable for a specified period, and the Bank shall comply with such a directive." Provision is made for the publication of directives.

This new arrangement replaces a former one whereby the Governor had a degree of independence insofar as he could veto the actions or decisions of the board of directors or of the executive committee of the board of directors of the Bank. The Governor had to inform the Minister of Finance of a veto, and the Minister, in turn, had to submit its confirmation or disallowance to the Cabinet. The new provisions for Government directives to the Bank will probably not be an ordinary part of the management of monetary policy; rather, it is likely to be reserved for emergency situations.

B. Changes in Central Bank Control Techniques

In the decennial changes made in 1954, the Bank of Canada was given the power to vary between 8 and 12 percent the minimum cash-reserve requirement of chartered banks. The Bank never used this power and considered it only as an emergency instrument. This authority has now been repealed and replaced with one allowing the Bank to specify secondary reserve requirements—notes of, and deposits with, the Bank of Canada, one year or less Treasury bills, and day loans made to investment dealers who have access to the Bank's discount window. When no secondary-reserve ratio is in effect, the Bank is not allowed to impose one above 6 percent, and then only after a months' notice. When such a ratio is in effect, any increase for a following month may not be more than one percent, and the maximum level for any month cannot exceed 12 percent.

In order to allow the Bank of Canada to participate more readily in cooperative arrangements among central banks, the new legislation permits it to accept deposits from other central banks, and also from international financial institutions, and to pay interest on such deposits The Bank of Canada's requirement to maintain a gold reserve against its outstanding note and deposit liabilities, which has not operated for many years, has now been formally abandoned.

V. *Deposit Insurance*

An entirely new piece of Federal financial legislation, enacted early in 1967 while the parliamentary committee was reviewing the existing legislation, was the act incorporating the Canada Deposit Insurance Corporation (CDIC). It established a Federal deposit insurance system in many respects similar to that in effect in the United States. The CDIC has an authorized share capital of $10 million provided by the Federal government. Its board of directors consist of the chairman appointed by the Government, the Governor of the Bank of Canada, the Deputy Minister of Finance, the Superintendent of Insurance, and the Inspector General of Banks.

Banks and Federally-incorporated loan and trust companies which accept deposits from the public are required to become Federal deposit insurance system members. Provincially-incorporated trust and loan companies accepting deposits from the public may apply for membership with the prior approval of the province in which they are incorporated. Most

of the provinces have indicated that they will require institutions incorporated by them to become members of the Federal insurance system; some have already passed legislation toward this end. Membership in the CDIC is not available to credit unions and *caisses populaires*—cooperative institutions which accept deposits from their members rather than the public.[11] Mutual insurance schemes are provided for many local credit unions, and the Federal government is still considering amendments to the Co-operative Credit Association Act to provide some sort of "lender-of-last-resort" facility for cooperative credit societies.

The primary function of the CDIC is to insure the safety of the deposits of small investors unable to judge the financial soundness of the institution to which they entrust their savings. Individual deposits are insured up to the maximum amount of $20,000.[12] However, following American practice, deposits will generally be insured 100 percent insofar as the CDIC can also act as lender of last resort to member institutions. The corporation can take action to prevent liquidation of a member institution in financial difficulty, by making loans or advances, by purchasing its assets, and by guaranteeing its loans or deposits. Also, as has been the case in the United States, one of the most important functions of the CDIC will be to provide inspection and to bring about an improvement in the minimum financial standards of deposit-accepting institutions.

Member institutions are required to pay annual premiums, as of April 30 of each year, equal to $500 or 1/30 of one percent of their *insured* deposits, whichever is the greater. When the deposit insurance fund accumulated through premiums has reached adequate proportions, premiums may be reduced. The CDIC has statutory authority to reduce annual premiums to an amount not less than $500, or which together with the aggregate total amounts of premiums previously paid by a member institution is equal to 1/6 of one percent of its insured deposits in the year to which the reduced premium applies. This means that if an institution has paid premiums for five years, it may not have to pay any more if its total deposits remain level. On any increased deposits it would pay 1/6 of one percent.

The premiums collected by the CDIC and its net earnings will probably be its main source of funds. It is allowed to add to these funds by issuing bonds and debentures. It may also borrow from the Federal government, but the total of such borrowing at any one time may not exceed $500 million.

The banks did not think that they should be included in the deposit insurance system. Although it was generally agreed that the deposits of existing banks were adequately protected without insurance, the Government believed that a successful system of insurance had to include banks, and that they will benefit insofar as deposit insurance will strengthen the public's confidence in deposit-accepting institutions generally. Moreover, since the intent of the revisions to the banking legislation was to promote competition, the introduction of deposit insurance can be considered an important supplement to the overall banking legislation insofar as it may increase the confidence of the public in deposit-accepting institutions other than banks.

VI. *Issues Remaining Unsettled*

Some important matters relating to the Canadian monetary system remain unsettled. These include the extension of

[11] The *caisses populaires* are credit unions which originated in the Province of Quebec where most of them are still found.

[12] Government deposits and deposits not payable in Canada or in Canadian currency are excluded.

Federal controls to near banks accepting deposits from the public, as recommended by the Porter Commission, modifications to clearing arrangements, and provisions to allow foreign banks to establish agencies in Canada.[13] The Minister of Finance has said that the Porter recommendation to apply Federal controls to near banks is still under consideration.[14]

This is also true of the provision for a more comprehensive clearing system. The Porter Commission recommended that the clearing system be taken over by the Bank of Canada. It is presently being operated by the Canadian Bankers' Association. A near bank may have clearing privileges through a chartered bank on payment of an arranged fee. The parliamentary committee which reviewed the bank acts recommended that those financial institutions with access to the clearing system only through the intermediary of a chartered bank be permitted to participate directly in the system on an equitable basis. Insofar as this recommendation entailed the extension of Federal controls to near banks, which could have been challenged in the courts, the Government has been reluctant to accept it.

The Government is also still studying the possibility of allowing foreign banks to establish agencies in Canada. It will probably introduce legislation within the near future which, following the recommendations of the Porter Commission, will allow this on a limited scale.

[13] Changes in Canada's financial system other than those which apply to banks and near banks have recently been made or are contemplated. A special Federal-provincial committee has been set up to study the mutual fund business. Following a study by the Federated Council of Finance Companies and the Investment Dealers' Association of Canada, the Ontario government introduced new securities legislation providing closer control over the financial accountability of investment and finance companies. At a special Federal-provincial conference in April 1967, the Federal government announced that it is considering securities legislation which might serve as a model for parallel legislation at the provincial level.

[14] See *Standing Committee on Finance, Trade and Economic Affairs, Minutes of Proceedings and Evidence,* Ottawa: No. 42, February 2, 1967.

Changing Goals of Monetary Policy: 1952-1966

► MARK H. WILLES

This note examines the manner in which the monetary authorities, since the Accord of 1951, have viewed the goals of full employment, price stability, economic growth, and the balance of payments. The discussion relating to the 1952-1960 period is based on the *Minutes of the Federal Open Market Committee and Its Executive Committee (Minutes),* and the *Memoranda on Business and Financial Conditions* prepared for the FOMC by the research staff of the Board of Governors *(Staff Memoranda).* The analysis of the 1961-1966 period is based on the *Annual Reports* of the Board of Governors.

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We consider only the *direction* in which the members of the FOMC *wanted* policy to move, since it is the changes *intended* by the monetary authorities that provide insight into their conception of the various goals of monetary policy. It is recognized, however, that an overall evaluation of Federal Reserve behavior would require a judgement on the efficiency with which policy decisions were implemented and the propriety of the proximate objectives of policy.

I. The Chronicle of Policy

A. 1952-1953

During 1952 and the early part of 1953, the FOMC followed a restrictive monetary policy designed to combat the *threat* of inflation. In May 1953, the Committee became concerned about stringencies in the money and capital markets and decided to supply reserves to the banking

system. It was stated that this move should not be regarded as a change in the direction of monetary policy.[1] However, in June, because of doubts concerning the strength of underlying economic conditions, diminished fear of inflation, and continued concern for the unsettled conditions in the Government securities market, the FOMC did begin to move policy in the direction of ease.[2] This policy reversal took place one month before the National Bureau of Economic Research (NBER) reference cycle peak date of July, and it preceded the FOMC's recognition of the peak by five months.[3]

B. 1954-1957

The next policy reversal took place in November 1954, and was coincident with the FOMC's recognition of the cyclical trough which had occurred in August.[4] This decision was based primarily on the Committee's concern for the possible emergence of speculative excesses and inflation.

In January 1956, the FOMC thought it saw signs of deflationary tendencies in the economy and shifted policy in the direction of ease.[5] As the year progressed, however, the staff reports failed to substantiate these impressions and, by March, policy was reversed.[6] Another reversal took place in May, when the Committee again believed it detected evidence of a decline in economic activity.[7] But by August, the staff was describing the economy as having an "upward tilt," and it was reporting that consumer prices were moving up more sharply than they had for some time. This led to another reversal of policy—this time in the direction of restriction.[8]

Early in 1957, the FOMC became aware that the movement of the economy was sideways rather than up, but it did not change the direction of monetary policy until October, three months after the peak. At the time, many analysts were forecasting an upturn in the economy for the second half of the year. Moreover, the Committee was greatly concerned about the level of prices, which had been rising sharply since the latter part of 1956. It was not until October 1957, therefore, when the staff reported that the economy was definitely tilting downward, that the Committee shifted policy in the direction of ease.[9]

C. 1958-1960

In late July 1958, just as soon as the upturn in the economy was recognized, the FOMC reversed the direction of monetary policy.[10] The majority of the Committee thought that inflation was the most pressing problem at the time, and they therefore voted to have monetary policy begin to move in the direction of restriction as soon as it seemed clear an expansion was underway.

In March 1960, when it noted that the money supply was trending downward, the FOMC decided to ease monetary policy. This decision was based primarily on the desire to reverse the downtrend of the money supply, in order to accommodate and stimulate economic expansion.[11] At the time, no recession was expected.[12] This was two months before the cyclical peak of May was reached, and six months before the FOMC recognized that turning point.[13]

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[1] *Minutes*, May 6, 1953, p. 7.
[2] *Minutes*, June 11, 1953.
[3] *Staff Memoranda*, November 5, 1953.
[4] *Minutes*, November 9, 1954.
[5] *Minutes*, January 24, 1956.
[6] *Minutes*, March 28, 1956
[7] *Minutes*, May 23, 1956.
[8] *Minutes*, August 7, 1956.
[9] *Minutes*, October 22, 1957.
[10] *Minutes*, July 8 and 29, 1958.
[11] *Minutes*, March 1, 1960.
[12] *Ibid.*, and *Minutes*, April 12, 1960.
[13] *Minutes*, September 13, 1960.

D. 1961-1966

The next policy reversal did not come until October 1961. The FOMC recognized the passing of the cyclical trough in April, two months after it occurred, but it did not shift the direction of monetary policy until six months later.[14] Prices were stable, there was uncertainty about the strength of the expansion, and the Committee was concerned about the high rate of unemployment. Consequently, it was not until it received reports of a sharp deterioration in the U.S. balance-of-payments position that the FOMC decided to retreat *slightly* from the policy of ease it had been following.

The most recent policy reversal came in 1966. Observing moderating tendencies in the economy and a lack of expansion in bank credit and the money supply, the FOMC reversed the direction of monetary policy in November.[15] As was the case in 1960, no recession was expected. The move was aimed at halting declines in the rate of growth of the money supply and the economy before they led to more severe economic adjustments. There is, as yet, no reference cycle peak with which to compare the timing of this policy reversal.

II. The Goals of Policy

A. 1952-1959

Between 1952 and 1959, cyclical stabilization was an important goal of monetary policy, and cyclical turning points were considered signals indicating the need to change direction.[16] The peak in 1953, when an unsettled Government securities market played an important role in the decision to ease, was perhaps an exception. The general view of the Committee during this period was that "when business was declining, it was appropriate to make easing adjustments, and when business was moving up also to make firming adjustments."[17]

The other important goal of monetary policy in the 1952-1959 period was price stability. Throughout the period, with one or two exceptions, most of the Committee discussions concerned rising prices or, if prices were not rising at the time, the threat of rising prices. It was shown in Section I how this concern was reflected in and influenced the timing of policy reversals.

The rate of unemployment was rarely discussed during the first half of the period, and later, when it did become a more frequent topic of discussion, the impression gained from the *Minutes* is that for most Committee members full employment was not a separate goal of monetary policy. The assumption seemed to be that cyclical and price stability would automatically result in full employment. Nor was economic growth considered to be a separate goal of monetary policy. As one staff member put it, "the price problem regardless of inflation, is the essence of the maintenance of stable economic growth."[18]

The FOMC began expressing concern about the balance of payments in 1958 and 1959. Yet, the direct influence of this factor on policy decisions was relatively minor. The majority view was that policy decisions should "be based primarily on domestic grounds,"[19] that if monetary policy sought to promote domestic price stability it would be doing all it could to

[14] 48th *Annual Report* of the Board of Governors of the Federal Reserve System, Washington, D.C., pp. 33-99.

[15] 53rd *Annual Report* of the Board of Governors of the Federal Reserve System, Washington, D.C., pp. 111-201.

[16] Policy reversals were coincident with the FOMC's recognition of the cyclical turning points in 1954, 1957 and 1958. In 1956, the Committee twice eased monetary policy because it (incorrectly) forecast a downturn in the economy.

[17] Statement by William McC. Martin, *Minutes,* September 9, 1958, pp. 52-53.

[18] Statement by Woodlief Thomas, *Minutes,* June 16, 1959, p. 9.

[19] Statement by Alfred Hayes, *Minutes,* January 12, 1960, p. 15.

help achieve balance-of-payments equilibrium.[20]

B. 1960-1966

It was not until 1960 that a majority of the FOMC began consistently to formulate monetary policy in terms of considerations outside the prices-business cycle framework, although some members had recognized the necessity of doing so earlier.[21] The easing of monetary policy in March 1960, aimed at contributing to "vigorous growth in the economy,"[22] marked the first time that economic growth was treated as a separate goal of monetary policy—something to which policy should respond directly.[23] Since that time, full employment and the balance of payments have also been regarded as distinct objectives of monetary policy. In 1961, for the first time in the post-Accord era, the FOMC did not tighten monetary policy when it recognized a cyclical trough. Even though business activity was expanding, unemployment remained at unacceptably high levels, and a policy of easing was continued until balance-of-payments considerations prompted a change. Moreover, monetary conditions were kept stimulative for a long period afterward, as the FOMC continued efforts to stimulate production and employment.

It is undoubtedly true that changed economic conditions have, in some degree, motivated this increased attention to the goals of growth, full employment, and the balance of payments. Price pressures were greater in the 1950's than they have been during most of the 1960's. Unemployment was low at the beginning of the 1950's and high at the beginning of the 1960's. Balance-of-payments positions have been different as well.

These differences, however, cannot completely explain the changes noted in Federal Reserve behavior. Unemployment was high and the rate of growth low in the latter part of the 1950's, yet these matters were not treated as policy goals. The policy discussions throughout the 1950's were in terms of business cycles and prices. In the 1960's, they have been in terms of full employment, economic growth, prices and the balance of payments. The Federal Reserve has changed the way it views the different goals of monetary policy—it has changed its policy framework.

III. Conclusions

When monetary policy was formulated primarily in terms of price movements and changes in the phase of the business cycle, the other policy goals received a greater or lesser weight depending on how they moved in relation to the reference cycle.[24] These weights were not always the result of a conscious evaluation of the social worth of each objective. Under the present policy approach, each goal is considered individually and the weight attached to it reflects the priorities of the policymakers. The tradeoffs, instead of being implicit and perhaps somewhat haphazard, are explicit. Another result is a shift in the timing of policy changes. The formulation of

[20] See, for example, *Minutes*, July 28, 1959, p. 13.

[21] See, for example, *Minutes*, February 15, 1956, pp. 8-29, August 19, 1958, p. 46, and January 6, 1959, p. 8.

[22] *Minutes*, March 1, 1960, p. 25.

[23] The policy shift in the Fall of 1966 demonstrates that the FOMC continues to regard economic growth as a distinct policy objective.

[24] It is easily shown that specific cycle turning points in series used to measure the rate of unemployment, economic growth, and the balance-of-payments position are not usually coincident with NBER reference cycle dates. Other characteristics of these series would probably be similarly dispersed around a reference cycle series if such a series existed. Consequently, in the 1950's a specific goal would implicity receive a greater weight in the formulation of monetary policy, the closer its movements approximated the FOMC's view of movements in the business cycle.

monetary policy in relation to the rate of growth of the money supply and the economy, both of which usually precede actual downturns in economic activity, makes it seem likely that policy may well be altered in advance of future cyclical peaks even in the absence of timely and correct forecasts. This should help, as it seems it has in the 1960's, to compensate for the lags in the effects of monetary policy and to head off economic declines before they become serious.

Money Supply Versus Interest Rates: A Rejoinder

► WILLIAM G. DEWALD

The major confusion that remains in the Gramley and Chase view of financial markets[1] involves the distinction between the supply-of-money function and the equilibrium quantity of money. It seems quite clear that the presence of such variables as required reserve ratios and bank reserves in the equilibrium money function, when the variables are not present in the demand-for-money functions, implies that they emanate in the supply function of money. It remains a mystery to me why Gramley and Chase would argue that the quantity of money is entirely a demand-determined magnitude when their equilibrium relation involves variables that affect the supply of money rather than demand. The equation that I labeled the money-supply function looks like the Gramley-Chase equilibrium condition to them but it is not the same. My supply function depends on the demand for excess reserves—given reserves, required reserve ratios, and time deposits and currency held by the public. Gramley and Chase seem to think that they have eliminated the supply relationship when they have only suppressed it by talking about the equilibrium relation and the demand relation. They fail to see that under the assumptions made, the demand for excess reserves determines a supply function of money. They prefer to think in terms of the supply and demand for reserves but, as my article showed, this implies a money-supply function.

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[1] Lyle E. Gramley and Samuel B. Chase, Jr., "Money Supply Versus Interest Rates—A Reply," *The National Banking Review*, 4, December 1966.

Insofar as the evidence of countercyclical variation in bank reserves is concerned, Gramley and Chase may be right in looking at effective reserves or reserves available for private deposits, rather than reserves available for private demand deposits and the de Leeuw money-supply function. My point was that the policy actions appeared to be less expansive in the period following cyclical peaks than over the entire period from peak to trough. Of the three such periods examined, two were identified as ones in which policy actions were less expansive following peaks than over the entire peak-to-trough period. Gramley and Chase identify only one such period with their measures. They do not look at the periods around peaks and troughs in interest rates, as could be appropriate if changes in interest rates reflect decisions to reverse policy actions. This would make little difference in interpreting the 1953 or 1957 peaks, but in 1960 there was a decline of over $250 million in reserves available for private deposits between the peak interest rate quarter and the peak business quarter. This is equivalent to the 3.4 percent annual rate of decline in reserves available for private deposits that accompanied the 3.3 percent annual rate of decrease in the money supply in the period November 1959-May 1960 as reported in Table 1 in the Gramley-Chase comment. It was a period when declining interest rates gave the impression of expansionary policy actions when policy actions were contractionary by each measure.

With respect to my point about the necessity to look beyond monetary factors to explain interest rates in the very long run, Gramley and Chase cited the authority of Lloyd Metzler who, in a 1951 article, argued that wealth effects of open market operations would affect long-run equilibrium interest rates. Gramley and Chase say that "To our knowledge no one has yet successfully refuted the position so elegantly expounded by Professor Lloyd Metzler in 1951" (p. 213). The Metzler argument depends on the wealth of the private sector being affected by open market operations. But it ignores the fact that the interest burden of government debt must be financed by taxes, and if the private sector discounts future interest receipts the same way it discounts future tax liabilities, there would be no private wealth effect from open market operations. Money illusion is present when wealth holders ignore to some extent their future tax liabilities.[2] This is not the only, nor the most important, source of money illusion in the economy, the presence of which makes it possible for the central bank to affect interest rates under any circumstances. My point was that it has a great deal less chance of affecting interest rates—the focal point of policy to Gramley and Chase—in the long run because experience tends to teach people the cost and their delusions. How else could one explain the fact that interest rates tend to be highest in countries with the most rapidly expanding monetary base and price level?

[2] See Martin J. Bailey, *National Income and the Price Level*, New York, 1962; Carl Christ, "Patinkin on Money, Interest, and Prices," *Journal of Political Economy*, LXV, 1957, pp. 349-350; and Don Patinkin, *Money, Interest and Prices*, 2nd Edition, New York, 1965, p. 289.

A Further Comment on an Aspect of the "Band" Proposal

► HENRY N. GOLDSTEIN

In his recent penetrating analysis of the alleged merits of the "band" proposal, Professor Yeager concedes that "the band compromise scores a [particular] point over the present system—if forward support is in fact a sound idea." [1] The point conceded is that the *scope* for forward exchange intervention is considerably greater if the margins within which the spot rate can fluctuate around par are relatively wide (for example, plus or minus 5 percent) rather than relatively narrow (for example, plus or minus one percent).

In fact, however, this particular concession to advocates of the band proposal seems unnecessary. I shall argue that, in nearly all relevant circumstances, forward support will be as effective with the existing IMF spot margins as with wider margins.

We need to distinguish two different situations. In the first, there exists a significant degree of market doubt that the authorities will be able to defend the current limits within which they permit the spot exchange rate to move. In particular, we suppose that the market believes there is a significant chance of a *de facto* devaluation of the home currency. In this situation, we assume that the authorities desire to peg the price of the weak domestic currency in the forward market in order to prevent speculation from pushing it to an *intrinsic discount* [2] which would stimulate an outflow of arbitrage funds—defined comprehensively to include leads and lags, and the like. This policy we shall call "defensive" forward intervention. Presumably, a need for it exists only when the basic payments balance is weak and the spot rate is at or near its lower support point.

In the second situation, there is considerable market confidence that the present margins for spot-rate fluctuations will be maintained, but the authorities nevertheless desire to peg the forward rate at an intrinsic permium in order to induce a net inflow of short-term funds.

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[1] Leland B. Yeager, "A Skeptical View of the 'Band' Proposal," *The National Banking Review*, 4, March 1967, p. 293.

[2] The home currency is said to be at an intrinsic discount (in a particular arbitrage comparison) when there is a covered interest incentive to shift short-term funds to the representative foreign center. When domestic interest rates are below foreign rates, the home currency could be at an intrinsic discount even though the forward price of the home currency were above the spot price. Similarly, when domestic rates exceed foreign rates, the home currency could be at an intrinsic premium even though the foreign-currency price of the home currency were lower in the forward market than in the spot market.

We shall call this policy, "aggressive" forward intervention. Here it seems reasonable to suppose that the basic payments position is in fair shape and that the current spot rate is at or close to par.[3]

The question at issue is whether wider spot margins would significantly facilitate either aggressive or defensive intervention. I shall argue that it would not, since existing margins of plus or minus one percent around a reference currency suffice to create whatever covered margins are necessary to "do the job."[4]

Let us define the exchange rate as the price of one unit of the home currency in terms of the reference currency, and consider the extent to which the current narrow IMF margin constrains defensive forward intervention. If units are set so that par is 100, then the existing IMF support floor for the home currency would be 99 and the permitted IMF ceiling will be 101. By assumption, the spot rate is "on the floor" at 99. If interest rates are at the same level in the weak-currency home country as in the reference-currency center, the authorities need merely peg the forward price of the home currency at the same level as the spot rate in order to prevent an intrinsic forward discount from appearing. If interest rates are two percent per annum higher in the home country than in the reference-currency center, they must peg the 3-months' forward rate at a level no lower than 99.5; if interest rates are two percent lower in the home country, the required 3-months' forward peg is 98.5. But, note: in this situation, nothing of substance would be changed if there did exist a wider band within which the spot rate might fluctuate. Indeed, nothing would be changed if there were no band at all and the spot rate were never allowed to differ from par. In short, when the existing support point is suspect, forward intervention *of a defensive character* is neither facilitated nor handicapped by a wider or narrower range of permissible spot fluctuations around a given (suspect) parity.[5]

Consider next the second polar situation. By assumption, there is confidence in the existing margins around par, the existing spot rate is 100, and—for reasons that may vary—the authorities want to create a positive, covered incentive in favor of the home currency. At what level must they peg the forward rate? This depends, of course, on the size of the covered incentive they seek to establish and on the relevant interest-rate differential. In most instances, it is unlikely they would seek to establish a covered incentive greater than 100 basis points.[6] Accord-

[3] This is a conservative assumption. If the basic balance is strong and the spot rate is above par, it is unlikely that the authorities would seek to induce an inflow of covered funds. If the basic balance is weak and the spot rate is below par, the permissible scope for aggressive intervention (in order to induce an inflow of funds as would normally be desired) would be even greater than that which we shall show exists when the spot rate is at par.

[4] In what follows we shall assume that the relevant arbitrage comparison is always between the home currency and some given reference currency. But as Yeager notes (*op. cit.*, p. 291), the maximum range of fluctuation between two ordinary currencies would be approximately 4x percent if each ordinary currency were allowed to appreciate or depreciate as much as x percent from its parity defined in a common-denominator currency. Thus, the spot margin between two ordinary currencies is always wider than the margin between an ordinary currency and the reference currency. It follows that, if the existing "narrow spot margin" between a given currency and the reference currency can be shown not to constrain effective forward operations in these two currencies, it certainly does not constrain such operations in the exchange market between the given currency and a nonreference currency.

[5] With a margin of plus or minus 5 percent, the relevant initial value of the spot rate, in the circumstances assumed, would be 95 instead of 99. But this alters nothing of consequence.

[6] In today's world, substantial covered flows between given currencies and the Eurodollar market occur when incentives as high as 50

ingly, if interest rates at home were as high as rates in the reference-currency center (or higher), the authorities' objective would be accomplished by pegging the 3-months' forward rate at a level no greater than 100.25. This is well below the 101 ceiling for the spot rate when the margin of fluctuation around par for the spot rate is one percent. Moreover, the level at which the authorities would need to peg the forward rate would be even farther below the 101 ceiling if the existing spot rate were less than par. The existing "narrow" margin would be unlikely to constrain effective aggressive forward intervention, even if the domestic interest rate were considerably below the relevant foreign rate. Thus, if the spot rate were at par, and domestic interest rates were as much as 300 basis points below the revelant foreign rate, the 3-months' forward rate necessary to obtain a 100 basis point covered incentive would still be only 101. Existing margins would cause a problem only if the spot rate were considerably above par and/or if domestic interest rates were more than 300 basis points below interest rates in the reference currency.[7] That the authorities would ever want to pursue a policy of aggressive forward intervention in such peculiar circumstances seems—on the whole—unlikely.

basis points appear. As a recent report in *The Economist*, July 8, 1967, p. 133 noted:

> On Wednesday the key covered arbitrage margin on swaps of three-month Euro-dollars against UK local authority deposits had swung to 9/16 per cent in New York's favour, and that's the kind of margin funds move on.

[7] The reader will note that we have used a 3-months' arbitrage comparison in all of the numerical examples. The general results obtained—that existing spot margins pose no effective constraint on aggressive forward intervention—hold *a fortiori* for covered arbitrage investments of shorter duration. On the other hand, they do not *necessarily* hold for arbitrage transactions of longer maturities. The point is an algebraic one: If we let P = the percent per annum premium on the home currency for delivery in n days, F = the foreign currency price of a unit of the home currency for delivery n-days hence, and S = the corresponding spot exchange rate, we have:

$$P = \left(\frac{F - S}{S}\right)\left(\frac{365}{n}\right)\left(100\right)$$

For given values of F and S, P varies inversely with n. Conversely, the absolute spread between F and S required to generate a given value P also varies inversely with n. In particular, if n is small—say 10 days—a relatively small spread between F and S will still generate a substantial percent per annum premium.

Thus our general argument hinges, to some extent at least, on a factual question: whether the majority of forward transactions by arbitragers are for periods of more or less than three months. On the basis of "casual empiricism," the present writer would hazard that the forward cover for most arbitrage flows is in fact for periods of three months or less.

A Skeptical View of the "Band" Proposal: A Comment

► E. RAY CANTERBERY

In recent international finance, as in its past, two ideological horses have galloped off in opposite directions. There is one moving toward the extreme of absolutely-fixed exchange rates, the other toward absolutely-free rates. Leland B. Yeager recently rode the latter into the pages of this *Review*.[1] It is a welcome article, but it has an effect opposite that probably intended by its author. Yeager's arguments, though designed as a plea for *absolutely*-free exchange rates, turns out to be a ringing defense for the wide gold band.

The major premise at both extremes is that compromise would yield the worst system of all. By Yeager's own argument, however, this is shown to be a *non sequitur*. Extremism in the defense of free rates is not necessarily a virtue in contradistinction to all-out defense of enslavement by fixed rates. While peace is preferable to war, so might be a stalemate. In short, although someone's ideological axe may be dulled by compromise, the middle way is an economic policy option that often meets the real needs of the greatest numbers. Alongside the political *non sequitur* is the economic one—that a wide gold band incorporates the worst features of both fixed and free foreign exchange rates. Perhaps it sums the best features of each.

Yeager invokes at least three hidden assumptions: (1) a national goal of domestic economic policy independent of international financial considerations is unachievable under adjustable pegs but obtainable under free rates; (2) all major nations would eliminate for all time foreign-exchange reserves under a freely-fluctuating system; and (3) adjustments in par values would continue to be avoided under a wide gold band, apart from several versions of the "crawling peg."

In theory, the adjustable peg (as prescribed by the Bretton Woods Treaty) can lead to the appropriate adjustments in the balances of payments. In practice, payments remain in "fundamental disequilibrium" not because the theory is faulty, but rather because the pegs are not adjusted. A change in par values can align the market exchange rates with the "natural" free-market rates. While devaluation spells "adjustment" to the economist, it nonetheless says "political suicide" to a government. But under free exchange rates, the monetary or fiscal authorities also may depress the national economy for the good-intentioned but misguided motive of saving the "integrity of pound sterling." In the absence of an explicit goal of independence in domestic economic policy, the market exchange rate is not changed under the adjustable peg, and

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[1] Leland B. Yeager, "A Skeptical View of the 'Band' Proposal," *The National Banking Review*, 4, March 1967, pp. 291-297.

the domestic economy may be altered under "free" rates to keep the exchange rate from approaching the true "natural rate."

Under a wide gold band, the exchange-rate would be free within the band, enabling some payments adjustments before possible pressures at the upper or lower limits force the fiscal and monetary authorities to act to preserve the par limits. The problem at the exchange-rate boundaries is devising a workable formula of par-value changes. This is a difficulty transcending the wide gold band *per se*. I have elsewhere suggested a "delayed peg" system which could accomplish this without the disadvantages of the "crawling peg" cited by Yeager.[2] I will not bore the reader with the details of such a plan, but merely note that Yeager has presumed that the band is immovable.

The most damning indictment that Yeager can level at the wide gold band is that ". . . problems of speculation are likely to be worse under the band system than under truly free exchange rates." [3] With currently rigid rates, he nonetheless admits, ". . . speculators will win on an expected change in parity and will nearly break even if the change is avoided." [4]

This is symptomatic of the anti-non-pure-system syndrome. The wide gold band would be better than the current system but not as good as the other extreme. With smaller exchange reserves required under the wide gold band, however, the ability to cope with *less* speculation would be enhanced. The marginal cost of adding to reserves is greater than zero under the current or the wide-gold-band systems. The total cost would be reduced, however, by the necessity of holding fewer reserves under the band. Nevertheless, Yeager worries about the costs of holding reserves, a concern which is irrelevant. Foreign currency and gold reserves still would be held under freely-fluctuating rates because all governments would fear that exchange rates might once again become fixed. The temptation to intervene with such reserves will always be with us; the revelant question is whether the intervention should be triggered on a planned basis or left to the hazard of ad-hocism.

It has not even been demonstrated that "in comparison with free rates, the band system provides more crisis points and more activities about which speculators' interpretations could suddenly change." [5] It is true that speculators know when the exchange limits are reached under a wide band. But, given the infinite number of possible exchange rates under a free system, it is a paradox to argue that a greater number of "crisis points" exist under a wide gold band. Speculators will be close market observers under the free system as well. If the concept of a "normal price" range—within which the speculators believe the market rate will fluctuate—exists, speculation in a free system will be stabilizing. But since there has been no willingness to try the completely-free route for a sufficient time span, no one knows for sure whether the "normal price" concept *would* prevail. This uncertainty in itself is sufficient to cause governments to continue to maintain reserves for stabilization purposes.

Yeager goes on to present some cogent arguments that favor a wide gold band. The band system would increase the scope for official forward-exchange-rate policy. With more covering-forward re-

[2] See the forthcoming monograph-supplement, *Economics on a New Frontier*, Belmont, California: Wadsworth Publishing Company, 1968. Yeager is succinctly correct when he states that for the prevention of capital outflows " . . . interest rates would have to be higher enough than otherwise in a weak-currency country and lower enough in a strong-currency country" under the "crawling pegs" of J. Carter Murphy and John H. Williamson.

[3] *Op. cit.*, p. 294.

[4] *Ibid*, p. 293.

[5] *Ibid*, p. 294.

quired by the greater uncertainty regarding rates, the stabilization authorities could maintain a neutral differential between international interest rates without disrupting the exchange market. Still, argues Yeager, "it does not necessarily score over completely free rates. . ." [6] The "not necessarily" is his own wise *caveat*.

Herein is the most obvious contradiction. Absolutely-free rates are workable if they do not actually fluctuate widely in the short run. Yet exchange rates must move sufficiently to accommodate trade-account adjustments. Suppose economists' crystal balls are sufficiently cloudy that they are slightly uncertain about how wide and fast the rates might move. Under this condition of uncertainty, reasonable men may advance the notion that a gold band be imposed—sufficiently wide for stabilizing short-term capital flows and even the trade account, but prudently narrow enough not to frighten traders and bankers. This requires only a slight change in wording of one article of the Bretton Woods Agreement. If it becomes necessary to defend either limit for a long siege, the band could be moved. The band advocates claim success because free-rate fluctuation would have been too great; the free-rate protagonists embrace victory, since free rates worked for a while. World exporters-importers embrace each other because, for once, a policy had been invoked for the purpose of steady trade expansion. If a band size sufficiently wide and necessarily narrow does not exist under freely-fluctuating exchange rates, the free system will never work anyway.

An otherwise objective discussion ends with an *argumentum ad hominem*: "When some economists recommend the policies they really expect to work best while others recommend compromises based on their amateur assessments of political acceptability, they create a spurious impression of disagreement among themselves and undermine the authority of their technical knowledge." [7] This classic confusion between theory and practice implies that those economists who embrace less-than-completely-free exchange rates are either (1) rank political amateurs, (2) technically incompetent, (3) political opportunists, or (4) some combination of these. The facts are: (1) even a rank political amateur knows that all governments will not adopt freely-fluctuating exchange rates; (2) no economist, including the very capable Professor Yeager, has proven that completely-free rates are technically advantageous; (3) even in the physical sciences, knowledge is not perfect; in the social sciences it is far less conclusive. To argue that "disagreement" undermines the authority of economists is to confuse cause and effect. To say that debate does not generate knowledge is analogous to arguing that free speech can ruin a democracy.

Surely economists can do more than agree to invoke the impossible. It is one thing to defend the purity and "consistency" of a freely-fluctuating exchange rate model, but quite another to insist that all governments *will* embrace immediately the model's assumptions as a code of conduct. The *latter* is the presumption of the amateur politician and leads to bad economic advice, even though it *may* be good economic theory. The wider gold band is an admirable starting point for rationalizing exchange-rate levels, being both technically and politically superior to either rigid or absolutely-free rates. The next step beyond the band can assure its viability.

[6] *Ibid*, p. 293.

[7] *Ibid*, p. 297. For a long list of distinguished economists favoring *some type* of increased exchange-rate flexibility, see Fritz Machlup, *Plans for Reform of the International Monetary System*, Special Papers in International Economics, No. 3, Princeton, N. J.: International Finance Section, Princeton University, March 1964, pp. 79-81.

A Skeptical View of the "Band" Proposal: Reply

► LELAND B. YEAGER

Professor Goldstein makes a real contribution in asking how large a forward premium would be necessary to defend the currency of a country whose interest rates were lower than interest rates abroad. Assuming plausible sizes for the interest-rate spread and for the covered differential necessary to attract or retain funds, he shows that the forward premium would probably not have to be larger than is obtainable with present-day spot support limits.

Conceivably, however, when bearishness on the currency requiring defense was breeding an unreasoned hesitation about acquiring it, even with forward cover, the necessary covered differential might be larger than ordinarily. Having said this, one might wonder whether the distinction between cases of "defensive" and "aggressive" intervention is as sharp, after all, as Goldstein makes it—or whether "aggressive" is the precise word.

These remarks are admittedly inconclusive, which only shows how hard it is to salvage the argument about greater scope for forward intervention. Professor Goldstein is right: I conceded too much to the "band" proposal.

Professor Canterbery mentions my presenting "some cogent arguments that favor a wide gold band," thereby recognizing my concern to give the "band" proposal its due rather than just blow down a straw man. I tried to show why those "cogent arguments" are not persuasive. Canterbery gives no reasoned answer to my skepticism. He adopts the familiar debating tactic of first just asserting that my case rests on certain hidden assumptions and then attacking those assumptions. (Incidentally, anyone who "invokes . . . hidden assumptions" while keeping them hidden, as I supposedly did, is carrying off a neat trick, like drawing a square circle.) Readers who like metaphors and who savor recognizing sentences adapted from famous speeches may enjoy Canterbery's style, but I hope they understand that entertainment is not argument.

Canterbery does not clearly say why "it is a paradox to argue that a greater number of 'crisis points' exist under a wide gold band" than under free rates. To mention, as he does, that more levels are possible for a free rate than for a rate in a band surely does not dispose of the question of "crisis points."

The arguments for the types of "band" system I was discussing are not persuasive even to Canterbery. Otherwise, why would he have invented a new proposal of his own, whose implementation will make "[w]orld exporters-importers embrace each other," but with whose details he "will not bore the reader"?

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Canterbery sees it as a defect of the free-rate system that governments will not fully adopt it; for example, they will continue holding external reserves ready for possibly resuming intervention. This is not a defect of the system itself, however, but a political difficulty of getting it wholeheartedly adopted. The operating properties of alternative systems are what they are, regardless of how difficult it may be to understand those properties and to spread that understanding widely. How persistent the political difficulties will remain depends largely on what economists learn and teach about the exchange-rate issue and what doctrines eventually take hold in public opinion.

Canterbery says my article ends with an *argumentum ad hominem*. Yet I was no more impugning anyone's character than anyone's technical competence. I was referring to the known fact that a number of economists who actually expect free exchange rates to perform better than any compromise system have nevertheless endorsed the "band" or some such compromise because they think it is the best obtainable in the face of prevailing ideas and political realities or because they think it will pave the way for free flexibility. My purpose was to warn why such tactics are likely to boomerang. Far from wanting to cover up disagreement, I warned against letting different *political* assessments or different views about their relevance create an impression of more disagreement over *economics* than really exists. Far from saying "that debate does not generate knowledge," I was suggesting that debate about policy issues will be more fruitful if economists say what they really think than if they restrain themselves in view of what practitioners are supposedly ready to hear. I warned economists, in their policy recommendations, to avoid muddling together economic facts and analysis on the one hand and assessments of political possibilities on the other hand. Probably I said all this too briefly. I had become so persuaded myself of the dangers of "political realism" that I assumed a mere allusion to them would be enough for other people also. Canterbery, on the contrary, apparently admires political realism. I deplored economists' playing amateur politician; he apparently thinks the answer is for them to become *expert* politicians. I cannot hope to convert him here; I can only urge him to reconsider. He might well start by pondering Clarence Philbrook's "'Realism' in Policy Espousal," *American Economic Review*, December 1953.

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TABLE 1

Number of national banks and banking offices, by states, June 30, 1967

	National banks			Number of branches	Number of offices
	Total	Unit	With branches		
United States	4,783	3,347	1,436	9,710	14,493
Alabama	87	54	33	145	232
Alaska	5	0	5	41	46
Arizona	4	1	3	184	188
Arkansas	67	37	30	65	132
California	87	40	47	1,853	1,940
Colorado	119	119	0	0	119
Connecticut	30	8	22	184	214
Delaware	5	3	2	4	9
District of Columbia	9	1	8	54	63
Florida	200	200	0	0	200
Georgia	60	34	26	134	194
Hawaii	2	0	2	41	43
Idaho	9	3	6	101	110
Illinois	423	421	2	1	424
Indiana	123	56	67	274	397
Iowa	102	67	35	38	140
Kansas	171	146	25	25	196
Kentucky	80	39	41	121	201
Louisiana	47	15	32	147	194
Maine	21	6	15	73	94
Maryland	48	18	30	203	251
Massachusetts	90	23	67	364	454
Michigan	98	31	67	477	575
Minnesota	195	193	2	6	201
Mississippi	36	7	29	105	141
Missouri	98	79	19	19	117
Montana	49	49	0	0	49
Nebraska	127	108	19	19	146
Nevada	3	1	2	36	39
New Hampshire	52	32	20	27	79
New Jersey	147	43	104	484	631
New Mexico	34	15	19	58	92
New York	186	86	100	1,049	1,235
North Carolina	24	5	19	281	305
North Dakota	42	34	8	9	51
Ohio	224	91	133	582	806
Oklahoma	220	193	27	27	247
Oregon	12	6	6	220	232
Pennsylvania	343	187	156	865	1,208
Rhode Island	4	0	4	55	59
South Carolina	26	5	21	198	224
South Dakota	34	25	9	44	78
Tennessee	77	21	56	234	311
Texas	546	546	0	0	546
Utah	13	9	4	55	68
Vermont	27	14	13	37	64
Virginia	114	41	73	383	497
Washington	28	13	15	361	389
West Virginia	80	80	0	0	80
Wisconsin	114	102	12	24	138
Wyoming	40	40	0	0	40
Virgin Islands	1	0	1	3	4
D.C.—all *	14	1	13	90	104

* Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

TABLE 2

Total and principal assets of national banks, by states, April 25, 1967
(Dollar amounts in millions)

	Number of banks	Total assets	Cash assets*	U.S. Government obligations, net	State and local securities, net	Other bonds, notes, net	Loans and discounts, net	Federal funds sold	Direct lease financing	Fixed assets
United States	4,790	$235,612	$36,753	$30,555	$26,410	$4,358	$126,307	$3,057	$339	$3,560
Alabama	87	2,680	446	440	320	75	1,309	25	—	45
Alaska	5	277	31	48	31	8	144	3	0	10
Arizona	4	1,828	198	177	176	54	1,142	2	1	55
Arkansas	67	1,208	212	167	151	34	594	17	—	24
California	88	30,107	4,039	3,176	3,511	665	17,014	193	126	498
Colorado	119	2,511	429	340	232	25	1,360	42	4	54
Connecticut	30	2,102	307	166	321	16	1,202	20	1	54
Delaware	5	27	3	8	1	1	13	1	0	—
District of Columbia	9	1,726	283	385	87	11	842	18	0	24
Florida	200	6,244	1,148	1,052	697	216	2,787	116	1	144
Georgia	60	3,209	604	315	293	72	1,775	26	9	69
Hawaii	2	441	46	52	50	14	248	10	1	14
Idaho	9	743	76	103	94	5	422	15	—	15
Illinois	423	20,873	3,134	3,326	2,239	479	10,746	324	51	166
Indiana	123	4,963	749	903	486	115	2,487	99	7	64
Iowa	102	1,715	348	273	159	44	843	15	1	23
Kansas	170	2,084	329	406	233	65	975	17	—	27
Kentucky	80	1,594	234	294	180	18	798	26	1	25
Louisiana	47	3,072	560	542	329	34	1,445	56	1	43
Maine	21	505	74	63	60	5	282	8	0	9
Maryland	48	2,097	342	280	193	37	1,142	51	2	27
Massachusetts	90	6,292	1,151	591	697	35	3,513	85	5	77
Michigan	98	9,610	1,381	1,427	1,058	183	5,209	115	9	132
Minnesota	194	4,780	794	620	523	116	2,608	10	4	63
Mississippi	36	1,141	198	162	132	16	590	6	—	27
Missouri	98	4,414	900	585	452	56	2,245	61	8	44
Montana	49	679	82	118	77	11	366	4	—	14
Nebraska	127	1,899	358	247	175	91	976	9	1	28
Nevada	3	497	50	84	65	6	253	14	—	21
New Hampshire	52	556	83	68	46	2	326	19	0	10
New Jersey	148	7,427	858	978	1,143	118	4,026	138	2	111
New Mexico	34	749	124	122	76	2	382	20	—	17
New York	188	36,070	5,758	3,265	3,649	414	20,719	656	46	408
North Carolina	24	2,188	395	182	299	57	1,183	3	—	34
North Dakota	42	597	71	115	68	17	303	6	0	12
Ohio	225	10,618	1,377	1,622	1,367	217	5,553	164	15	135
Oklahoma	220	3,556	683	603	384	107	1,623	65	4	57
Oregon	13	2,973	423	400	327	71	1,609	28	4	63
Pennsylvania	348	15,754	2,044	2,058	2,166	200	8,606	246	20	208
Rhode Island	4	845	88	67	137	8	529	2	0	10
South Carolina	26	1,065	188	153	95	21	577	1	0	23
South Dakota	34	670	85	133	57	16	357	3	—	13
Tennessee	77	4,041	749	579	399	43	2,120	24	0	65
Texas	545	15,450	3,328	1,910	1,669	341	7,525	174	1	351
Utah	13	780	117	66	133	6	427	5	2	13
Vermont	27	342	30	47	34	7	212	5	0	6
Virginia	114	3,697	477	521	392	54	2,129	32	1	66
Washington	28	3,966	622	462	438	51	2,226	15	3	74
West Virginia	80	1,143	149	286	121	20	509	28	2	20
Wisconsin	113	3,308	528	468	346	68	1,778	31	3	56
Wyoming	40	452	63	90	37	12	232	3	—	11
Virginia Islands	1	45	5	10	5	—	24	0	0	—
D.C.—all †	14	2,610	401	557	142	18	1,339	38	0	31

* Cash, balances with other banks, and cash items in process of collection.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 3

Total and principal liabilities of national banks, by states, April 25, 1967
(Dollar amounts in millions)

	Total liabilities	Total deposits	Demand deposits, total	Time and savings deposits, total	Demand deposits, IPC*	Time deposits, IPC	Federal funds purchased
United States	$216,767	$204,183	$103,915	$100,268	$78,722	$87,615	$3,065
Alabama	2,455	2,391	1,401	990	1,023	937	5
Alaska	259	256	127	129	102	81	0
Arizona	1,690	1,639	701	938	563	886	3
Arkansas	1,105	1,080	664	416	494	391	8
California	28,177	26,468	10,180	16,288	8,476	13,300	456
Colorado	2,313	2,250	1,167	1,083	922	981	24
Connecticut	1,930	1,850	1,038	812	923	729	13
Delaware	25	25	11	14	11	14	0
District of Columbia	1,599	1,558	941	617	825	606	12
Florida	5,765	5,599	3,132	2,467	2,324	2,152	38
Georgia	2,927	2,775	1,712	1,063	1,233	947	60
Hawaii	392	383	189	194	141	159	0
Idaho	690	677	339	338	260	338	0
Illinois	19,269	17,598	8,859	8,739	6,856	7,746	375
Indiana	4,577	4,351	2,304	2,047	1,789	1,854	89
Iowa	1,583	1,543	926	617	624	597	12
Kansas	1,889	1,858	1,141	717	749	666	9
Kentucky	1,451	1,427	851	576	720	539	2
Louisiana	2,801	2,750	1,747	1,003	1,289	860	10
Maine	458	435	235	200	206	190	9
Maryland	1,925	1,854	1,094	760	847	709	22
Massachusetts	5,732	5,322	3,534	1,788	2,787	1,602	150
Michigan	9,005	8,722	3,539	5,183	2,721	4,513	90
Minnesota	4,408	4,148	2,069	2,079	1,459	1,960	142
Mississippi	1,044	993	639	354	406	340	28
Missouri	4,017	3,844	2,369	1,475	1,618	1,332	74
Montana	630	609	286	323	229	303	5
Nebraska	1,739	1,665	1,033	632	728	620	39
Nevada	456	447	220	227	165	215	0
New Hampshire	504	459	275	184	233	168	2
New Jersey	6,869	6,596	3,057	3,539	2,530	3,413	58
New Mexico	690	670	381	289	285	242	5
New York	32,893	29,068	15,650	13,418	10,688	10,804	439
North Carolina	2,025	1,915	1,051	864	838	697	30
North Dakota	554	544	246	298	196	277	1
Ohio	9,770	9,406	4,372	5,034	3,416	4,644	60
Oklahoma	3,224	3,146	1,924	1,222	1,327	1,121	33
Oregon	2,769	2,675	1,093	1,582	922	1,262	15
Pennsylvania	14,262	13,645	6,270	7,375	5,044	6,704	240
Rhode Island	785	761	282	479	227	458	4
South Carolina	974	934	727	207	581	192	2
South Dakota	621	608	296	312	224	289	3
Tennessee	3,706	3,513	2,001	1,512	1,307	1,331	66
Texas	14,153	13,519	7,995	5,524	5,772	4,494	325
Utah	721	695	280	415	210	340	10
Vermont	314	303	106	197	96	193	1
Virginia	3,387	3,260	1,495	1,765	1,237	1,666	35
Washington	3,682	3,551	1,819	1,732	1,466	1,716	10
West Virginia	1,032	1,007	544	463	416	459	7
Wisconsin	3,064	2,946	1,392	1,554	1,065	1,373	12
Wyoming	412	403	192	211	140	192	3
Virgin Islands	43	42	19	23	10	14	0
D.C.—all †	2,407	2,347	1,384	963	1,230	939	13

* IPC deposits are those of individuals, partnerships, and corporations.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
Note: Data may not add to totals because of rounding.

TABLE 4

Capital accounts of national banks, by states, April 25, 1967
(Dollar amounts in millions)

	Total capital accounts	Debentures	Preferred stock	Common stock	Surplus	Undivided profits	Reserves
United States	$18,845	$1,204	$30	$5,205	$8,372	$3,459	$575
Alabama	225	0	0	71	93	49	12
Alaska	18	—	0	5	5	7	1
Arizona	138	26	0	33	58	19	2
Arkansas	103	1	0	31	43	25	3
California	1,930	144	0	506	820	438	22
Colorado	198	4	—	63	91	39	1
Connecticut	172	11	0	45	87	28	1
Delaware	2	0	0	1	1	—	—
District of Columbia	127	0	0	35	65	26	1
Florida	479	23	0	184	196	62	14
Georgia	282	57	0	60	103	35	27
Hawaii	49	12	0	9	18	8	2
Idaho	53	0	0	17	28	8	—
Illinois	1,604	11	—	536	765	238	54
Indiana	386	13	0	94	182	89	8
Iowa	132	0	0	34	58	38	2
Kansas	195	2	0	56	85	49	3
Kentucky	143	0	0	31	74	35	3
Louisiana	271	9	3	62	145	51	1
Maine	47	0	0	18	17	11	1
Maryland	172	2	0	46	80	39	5
Massachusetts	560	11	0	149	298	96	6
Michigan	605	46	3	158	264	103	31
Minnesota	372	16	0	118	153	79	6
Mississippi	97	6	0	25	61	4	1
Missouri	397	26	0	108	158	97	8
Montana	49	1	0	19	19	10	—
Nebraska	160	3	—	43	62	48	4
Nevada	41	0	0	17	16	5	3
New Hampshire	52	—	0	10	28	13	1
New Jersey	558	28	—	157	260	102	11
New Mexico	59	0	0	20	20	8	11
New York	3,177	566	20	803	1,202	402	184
North Carolina	163	15	0	39	85	22	2
North Dakota	43	1	0	14	17	10	1
Ohio	848	27	—	235	422	160	4
Oklahoma	332	18	—	89	129	92	4
Oregon	204	0	0	71	78	47	8
Pennsylvania	1,492	57	1	306	784	282	62
Rhode Island	60	—	0	16	31	13	0
South Carolina	91	0	—	23	50	16	2
South Dakota	49	—	0	16	20	12	1
Tennessee	335	19	0	84	156	68	8
Texas	1,297	42	0	430	548	239	38
Utah	59	0	0	19	31	9	0
Vermont	28	—	1	8	11	7	1
Virginia	310	2	0	96	150	61	1
Washintgon	284	0	0	85	123	74	2
West Virginia	111	0	0	25	55	26	5
Wisconsin	244	2	0	79	109	45	9
Wyoming	40	1	0	6	20	12	1
Virgin Islands	2	0	0	—	1	1	—
D.C.—all*	203	13	0	48	100	41	1

* Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 5

Status of applications for national bank charters, and charters issued, April 1-June 30, 1967

Applications carried over from March 31, 1967	18
8 Conversions	
10 Primary	
Applications received March 31-June 30, 1967	19
1 Conversion	
18 Primary	
	37
Applications approved March 31-June 30, 1967	4
2 Conversions	
2 Primary	
Applications rejected March 31-June 30, 1967	7
1 Conversion	
6 Primary	
Applications abandoned March 31-June 30, 1967	1
0 Conversion	
1 Primary	
Applications pending June 30, 1967	25
6 Conversions	
19 Primary	
	37
* * *	
National banks chartered March 31-June 30, 1967	8
2 Conversions	
6 Primary	

TABLE 6

Status of applications for national bank charters* and charters issued,* by states, April 1-June 30, 1967

	Received†	Approved	Rejected	Abandoned	Pending June 30, 1967	Charters issued
United States	28	2	6	1	19	6
Alabama	1	0	1	0	0	0
Alaska	0	0	0	0	0	0
Arizona	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0
California	0	0	0	0	0	0
Colorado	1	0	0	0	1	0
Connecticut	1	0	0	0	1	0
Delaware	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0
Florida	5	0	0	0	5	0
Georgia	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
Idaho	0	0	0	0	0	0
Illinois	3	0	1	0	2	0
Indiana	0	0	0	0	0	0
Iowa	0	0	0	0	0	0
Kansas	1	0	1	0	0	1
Kentucky	0	0	0	0	0	0
Louisiana	1	0	0	0	1	0
Maine	0	0	0	0	0	0
Maryland	0	0	0	0	0	0
Massachusetts	1	0	0	0	1	0
Michigan	1	0	0	0	1	0
Minnesota	1	0	1	0	0	0
Mississippi	2	1	0	0	1	0
Missouri	0	0	0	0	0	0
Montana	0	0	0	0	0	0
Nebraska	1	0	0	0	1	0
Nevada	0	0	0	0	0	0
New Hampshire	1	1	0	0	0	0
New Jersey	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0
New York	0	0	0	0	0	3
North Carolina	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0
Ohio	1	0	1	0	0	0
Oklahoma	0	0	0	0	0	0
Oregon	0	0	0	0	0	0
Pennsylvania	1	0	1	0	0	0
Rhode Island	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0
Texas	2	0	0	0	2	1
Utah	1	0	0	0	1	0
Vermont	0	0	0	0	0	0
Virginia	1	0	0	1	0	0
Washington	1	0	0	0	1	0
West Virginia	1	0	0	0	1	0
Wisconsin	0	0	0	0	0	1
Wyoming	0	0	0	0	0	0

* Excludes conversions.

† Includes 10 applications pending as of March 31, 1967.

TABLE 7

Status of applications for conversion to national bank charters, and charters issued, by states, April 1-June 30, 1967

	Received*	Approved	Rejected	Abandoned	Pending June 30, 1967	Charters issued
United States	9	2	1	0	6	2
Alabama	0	0	0	0	0	0
Alaska	0	0	0	0	0	0
Arizona	0	0	0	0	0	0
Arkansas	1	1	0	0	0	1
California	0	0	0	0	0	0
Colorado	1	0	1	0	0	0
Connecticut	0	0	0	0	0	0
Delaware	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0
Florida	0	0	0	0	0	0
Georgia	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
Idaho	0	0	0	0	0	0
Illinois	0	0	0	0	0	0
Indiana	1	0	0	0	1	0
Iowa	0	0	0	0	0	0
Kansas	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0
Maine	0	0	0	0	0	0
Maryland	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0
Michigan	0	0	0	0	0	0
Minnesota	1	1	0	0	0	1
Mississippi	0	0	0	0	0	0
Missouri	0	0	0	0	0	0
Montana	4	0	0	0	4	0
Nebraska	0	0	0	0	0	0
Nevada	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0
New Jersey	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0
New York	0	0	0	0	0	0
North Carolina	1	0	0	0	1	0
North Dakota	0	0	0	0	0	0
Ohio	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0
Oregon	0	0	0	0	0	0
Pennsylvania	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0
Texas	0	0	0	0	0	0
Utah	0	0	0	0	0	0
Vermont	0	0	0	0	0	0
Virginia	0	0	0	0	0	0
Washington	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0

* Includes eight applications pending as of March 31, 1967.

TABLE 8

Status of de novo branch applications of national banks, by states, April 1-June 30, 1967

	Received*	Approved	Rejected	Abandoned	Pending June 30, 1967
United States	460	91	83	14	272
Alabama	7	3	1	0	3
Alaska	1	0	0	1	0
Arizona	5	1	1	1	2
Arkansas	3	2	0	0	1
California	64	12	15	2	35
Colorado	0	0	0	0	0
Connecticut	5	0	2	1	2
Delaware	0	0	0	0	0
District of Columbia	0	0	0	0	0
Florida	0	0	0	0	0
Georgia	5	2	1	0	2
Hawaii	3	0	0	0	3
Idaho	2	0	0	0	2
Illinois	14	7	0	0	7
Indiana	9	2	1	0	6
Iowa	4	1	0	0	3
Kansas	3	1	0	0	2
Kentucky	3	0	0	0	3
Louisiana	3	2	0	0	1
Maine	0	0	0	0	0
Maryland	15	3	4	2	6
Massachusetts	8	2	1	0	5
Michigan	28	3	7	0	18
Minnesota	0	0	0	0	0
Mississippi	7	2	2	0	3
Missouri	1	1	0	0	0
Montana	0	0	0	0	0
Nebraska	0	0	0	0	0
Nevada	1	0	0	0	1
New Hampshire	2	1	1	0	0
New Jersey	17	6	3	3	5
New Mexico	0	0	0	0	0
New York	64	5	25	2	32
North Carolina	11	2	2	1	6
North Dakota	2	0	0	0	2
Ohio	29	9	4	1	15
Oklahoma	1	1	0	0	0
Oregon	8	2	1	0	5
Pennsylvania	36	8	6	0	22
Rhode Island	2	2	0	0	0
South Carolina	6	1	1	0	4
South Dakota	2	0	0	0	2
Tennessee	3	3	0	0	0
Texas	0	0	0	0	0
Utah	1	0	0	0	1
Vermont	0	0	0	0	0
Virginia	10	3	1	0	6
Washington	14	4	4	0	6
West Virginia	0	0	0	0	0
Wisconsin	61	0	0	0	61
Wyoming	0	0	0	0	0
Virgin Islands	0	0	0	0	0
D.C.—all †	0	0	0	0	0

* Includes 276 applications pending as of March 31, 1967.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

TABLE 9

Branches of national banks: in operation March 31, 1967; opened, discontinued, or consolidated, April 1-June 30, 1967; and branches in operation June 30, 1967

	Branches in operation March 31, 1967	De novo branches opened for business April 1-June 30, 1967	Branches acquired through merger or conversion April 1-June 30, 1967	Existing branches discontinued or consolidated April 1-June 30, 1967	Branches in operation June 30, 1967
United States	9,559	141	37	27	9,710
Alabama	143	2	0	0	145
Alaska	42	0	0	1	41
Arizona	182	2	0	0	184
Arkansas	64	1	0	0	65
California	1,825	27	6	5	1,853
Colorado	0	0	0	0	0
Connecticut	179	5	0	0	184
Delaware	4	0	0	0	4
District of Columbia	53	1	0	0	54
Florida	0	0	0	0	0
Georgia	130	4	0	0	134
Hawaii	41	0	0	0	41
Idaho	101	0	0	0	101
Illinois	0	1	0	0	1
Indiana	273	1	0	0	274
Iowa	38	0	0	0	38
Kansas	25	0	0	0	25
Kentucky	120	2	0	1	121
Louisiana	145	3	0	1	147
Maine	72	1	0	0	73
Maryland	199	4	0	0	203
Massachusetts	358	6	2	2	364
Michigan	468	13	0	4	477
Minnesota	6	0	0	0	6
Mississippi	103	2	0	0	105
Missouri	19	1	0	1	19
Montana	0	0	0	0	0
Nebraska	18	2	0	1	19
Nevada	36	0	0	0	36
New Hampshire	27	0	0	0	27
New Jersey	473	6	5	0	484
New Mexico	56	2	0	0	58
New York	1,024	9	18	2	1,049
North Carolina	282	4	0	5	281
North Dakota	8	1	0	0	9
Ohio	574	7	2	1	582
Oklahoma	27	0	0	0	27
Oregon	218	2	0	0	220
Pennsylvania	851	12	3	1	865
Rhode Island	55	0	0	0	55
South Carolina	196	4	0	2	198
South Dakota	43	1	0	0	44
Tennessee	231	3	0	0	234
Texas	0	0	0	0	0
Utah	55	0	0	0	55
Vermont	36	1	0	0	37
Virginia	377	6	0	0	383
Washington	355	5	1	0	361
West Virginia	0	0	0	0	0
Wisconsin	24	0	0	0	24
Wyoming	0	0	0	0	0
Virgin Islands	3	0	0	0	3
D.C.—all*	89	1	0	0	90

* Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

TABLE 10

De novo branches of national banks opened for business, by community size and by size of bank, April 1-June 30, 1967

Category	Branches
In cities with population:	
Less than 5,000	46
5,000 to 24,999	34
25,000 to 49,999	23
50,000 to 99,999	12
100,000 to 249,999	7
250,000 to 499,999	8
500,000 to 1,000,000	5
Over 1,000,000	6
TOTAL	141
By banks with total resources: (in millions of dollars)	
Less than $ 10.0	20
10.0 to 24.9	36
25.0 to 49.9	9
50.0 to 99.9	13
100.0 to 999.9	28
Over 1,000.0	35
TOTAL	141

TABLE 11

Mergers,* April 1-June 30, 1967

Applications carried over from March 31, 1967	11
Applications received April 1-June 30, 1967	22
Disposition of applications April 1-June 30, 1967	
Approved	13
Disapproved	0
Withdrawn	0
Pending, June 30, 1967	20
Transactions completed—Total	18
Mergers	16
Consolidations	0
Purchase of assets	2

The aggregate totals of capital stock and capital accounts for certificates issued are as follows:

	Charter or purchasing banks	Merging, consol., or selling banks	Combined
Common stock	$103,851,901	$ 17,445,210	$113,940,533
Capital accounts	460,211,753	60,078,561	498,125,426

* Includes mergers, consolidations and purchase and sale transactions where the resulting bank is a national bank.

TABLE 12

Number of national banks and banking offices, by states, March 31, 1967

	National banks			Number of branches	Number of offices
	Total	Unit	With branches		
United States	4,792	3,368	1,424	9,559	14,351
Alabama	87	55	32	143	230
Alaska	5	0	5	42	47
Arizona	4	1	3	182	186
Arkansas	67	38	29	64	131
California	88	40	48	1,825	1,913
Colorado	119	119	0	0	119
Connecticut	30	9	21	179	209
Delaware	5	3	2	4	9
District of Columbia	9	1	8	53	62
Florida	200	200	0	0	200
Georgia	60	34	26	130	190
Hawaii	2	0	2	41	43
Idaho	9	3	6	101	110
Illinois	423	423	0	0	423
Indiana	123	57	66	273	396
Iowa	102	67	35	38	140
Kansas	170	145	25	25	195
Kentucky	80	39	41	120	200
Louisiana	47	15	32	145	192
Maine	21	6	15	72	93
Maryland	48	18	30	199	247
Massachusetts	90	23	67	358	448
Michigan	98	32	66	468	566
Minnesota	194	192	2	6	200
Mississippi	36	7	29	103	139
Missouri	98	79	19	19	117
Montana	49	49	0	0	49
Nebraska	126	108	18	18	144
Nevada	3	1	2	36	39
New Hampshire	52	32	20	27	79
New Jersey	148	44	104	473	621
New Mexico	34	15	19	56	90
New York	189	91	98	1,024	1,213
North Carolina	25	6	19	282	307
North Dakota	42	34	8	8	50
Ohio	225	92	133	574	799
Oklahoma	220	193	27	27	247
Oregon	13	7	6	218	231
Pennsylvania	349	194	155	851	1,200
Rhode Island	4	0	4	55	59
South Carolina	26	5	21	196	222
South Dakota	34	25	9	43	77
Tennessee	77	21	56	231	308
Texas	545	545	0	0	545
Utah	13	9	4	55	68
Vermont	27	14	13	36	63
Virginia	114	42	72	377	491
Washington	28	14	14	355	383
West Virginia	80	80	0	0	80
Wisconsin	113	101	12	24	137
Wyoming	40	40	0	0	40
Virgin Islands	1	0	1	3	4
D.C.—all *	14	1	13	89	103

* Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Company.

TABLE 13

Total and principal assets of national banks, by states, December 31, 1966
(Dollar amounts in millions)

	Number of banks	Total assets	Cash assets*	U. S. Government obligations, net	State and local securities, net	Other bonds, notes, net	Loans and discounts, net	Federal funds sold	Direct lease financing	Fixed assets
United States	4,799	$235,996	$41,690	$30,355	$23,778	$3,535	$126,881	$1,728	$331	$3,451
Alabama	87	2,709	521	464	312	32	1,305	9	—	43
Alaska	5	286	40	49	34	5	142	4	0	10
Arizona	4	1,827	240	173	152	20	1,161	1	1	55
Arkansas	67	1,236	251	175	148	35	591	5	—	22
California	91	29,703	4,423	3,014	2,850	438	17,470	208	123	485
Colorado	117	2,436	457	322	215	17	1,332	8	4	53
Connecticut	30	2,032	328	193	252	12	1,168	11	1	51
Delaware	5	27	3	8	1	1	12	1	0	1
District of Columbia	9	1,713	332	357	68	10	866	30	0	23
Florida	198	6,192	1,361	981	651	165	2,774	41	—	141
Georgia	58	3,140	678	314	239	26	1,743	24	8	64
Hawaii	2	442	62	47	45	5	259	1	1	14
Idaho	9	745	101	106	78	2	420	—	—	14
Illinois	422	20,398	3,206	3,107	2,047	423	10,825	133	50	161
Indiana	123	5,161	946	923	432	106	2,480	146	8	61
Iowa	102	1,705	384	274	147	36	822	7	1	22
Kansas	170	2,133	385	405	232	55	981	22	—	25
Kentucky	80	1,659	326	274	166	21	809	14	—	25
Louisiana	47	3,147	670	538	313	23	1,485	23	1	41
Maine	21	496	72	66	54	6	281	4	0	9
Maryland	49	2,138	415	287	170	27	1,161	25	2	25
Massachusetts	90	6,251	1,273	618	527	43	3,504	45	5	75
Michigan	99	9,400	1,447	1,512	938	115	5,106	52	10	125
Minnesota	194	4,717	885	614	505	111	2,469	24	3	63
Mississippi	36	1,124	192	166	132	12	581	3	—	26
Missouri	98	4,624	1,055	588	442	39	2,307	53	6	43
Montana	49	697	101	126	75	12	358	6	—	14
Nebraska	126	1,852	371	253	153	58	967	9	1	27
Nevada	3	494	61	79	59	6	259	5	—	20
New Hampshire	52	536	82	63	36	2	325	16	0	9
New Jersey	148	7,299	975	1,022	1,088	114	3,876	62	2	105
New Mexico	34	755	124	131	74	2	381	22	—	16
New York	190	37,078	7,128	3,150	3,424	411	21,201	101	47	407
North Carolina	27	2,175	405	224	254	61	1,161	4	—	33
North Dakota	42	600	77	120	73	18	293	1	0	12
Ohio	226	10,591	1,662	1,684	1,221	150	5,509	98	15	127
Oklahoma	220	3,711	803	572	368	85	1,723	27	3	56
Oregon	13	2,957	452	419	278	65	1,606	2	4	62
Pennsylvania	354	15,580	2,330	2,072	1,817	186	8,543	190	20	202
Rhode Island	4	838	82	58	139	8	533	2	0	10
South Carolina	26	1,114	252	150	86	16	562	12	0	22
South Dakota	34	671	93	139	58	15	347	1	0	13
Tennessee	77	4,154	872	574	397	36	2,137	6	0	59
Texas	546	15,647	3,479	1,975	1,606	303	7,602	170	1	347
Utah	13	789	131	59	125	6	442	4	2	12
Vermont	27	319	35	48	27	6	194	3	0	5
Virginia	114	3,674	531	489	355	50	2,127	27	1	64
Washington	28	4,043	725	485	429	48	2,198	24	3	70
West Virginia	80	1,137	172	292	115	18	498	17	2	20
Wisconsin	112	3,342	610	491	332	57	1,736	24	3	54
Wyoming	40	467	79	99	36	11	226	1	—	11
Virgin Islands	1	39	5	7	4	—	22	0	0	—
D.C.—all†	14	2,601	471	517	118	20	1,370	32	0	31

* Cash balances with other banks, and cash items in process of collection.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 14
Total and principal liabilities of national banks, by states, December 31, 1966
(Dollar amounts in millions)

	Total liabilities	Total deposits	Demand deposits, total	Time and savings deposits, total	Demand deposits, IPC *	Time deposits, IPC	Federal funds purchased
United States	$217,537	$206,456	$112,377	$94,079	$84,434	$83,025	$1,871
Alabama	2,493	2,435	1,512	923	1,091	873	1
Alaska	269	266	134	132	106	81	0
Arizona	1,689	1,627	749	878	590	840	16
Arkansas	1,137	1,122	719	403	532	376	1
California	27,770	26,117	10,749	15,368	8,923	12,901	161
Colorado	2,243	2,198	1,204	994	954	930	7
Connecticut	1,862	1,783	1,070	713	946	649	—
Delaware	25	25	12	13	12	13	0
District of Columbia	1,589	1,553	976	577	866	566	5
Florida	5,726	5,549	3,267	2,282	2,259	2,013	46
Georgia	2,886	2,747	1,789	957	1,273	855	24
Hawaii	393	384	202	182	147	151	0
Idaho	694	681	368	312	273	312	0
Illinois	18,822	17,707	9,809	7,897	7,502	7,054	255
Indiana	4,783	4,540	2,648	1,892	1,929	1,746	76
Iowa	1,575	1,554	980	574	691	552	—
Kansas	1,944	1,917	1,253	664	800	612	1
Kentucky	1,520	1,500	979	520	794	490	0
Louisiana	2,885	2,809	1,875	934	1,313	811	13
Maine	450	434	241	193	208	186	—
Maryland	1,969	1,896	1,165	731	918	678	22
Massachusetts	5,704	5,285	3,712	1,573	2,838	1,381	75
Michigan	8,803	8,566	3,736	4,830	2,952	4,264	43
Minnesota	4,353	4,241	2,304	1,936	1,568	1,819	1
Mississippi	1,031	990	658	333	442	320	23
Missouri	4,234	4,068	2,725	1,343	1,780	1,252	75
Montana	647	630	321	309	249	286	2
Nebraska	1,695	1,648	1,085	563	762	553	15
Nevada	453	444	223	221	171	209	1
New Hampshire	486	463	300	162	239	154	—
New Jersey	6,762	6,541	3,213	3,328	2,652	3,221	17
New Mexico	699	685	406	279	312	232	0
New York	33,927	30,339	17,337	13,002	11,718	10,560	433
North Carolina	2,014	1,912	1,133	779	891	637	27
North Dakota	558	545	261	284	222	269	1
Ohio	9,765	9,465	4,713	4,752	3,747	4,422	35
Oklahoma	3,387	3,291	2,154	1,138	1,568	1,053	26
Oregon	2,755	2,669	1,151	1,518	944	1,225	7
Pennsylvania	14,140	13,608	6,545	7,063	5,449	6,427	126
Rhode Island	778	748	283	465	236	427	6
South Carolina	1,027	973	783	190	633	174	0
South Dakota	622	611	309	302	248	277	0
Tennessee	3,830	3,672	2,221	1,451	1,456	1,305	41
Texas	14,386	13,865	8,666	5,199	6,143	4,253	230
Utah	731	711	327	384	233	314	6
Vermont	294	286	108	178	90	175	0
Virginia	3,375	3,263	1,641	1,622	1,336	1,535	11
Washington	3,761	3,611	1,956	1,656	1,593	1,646	35
West Virginia	1,030	1,001	558	443	415	438	—
Wisconsin	3,104	3,032	1,618	1,414	1,256	1,306	3
Wyoming	428	418	215	203	156	186	2
Virgin Islands	37	36	11	24	9	14	0
D.C.—all †	2,402	2,345	1,458	887	1,299	872	5

* IPC deposits are those of individuals, partnerships, and corporations.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 15

Capital accounts of national banks, by states, December 31, 1966
(Dollar amounts in millions)

	Total capital accounts	Debentures	Preferred stock	Common stock	Surplus	Undivided profits	Reserves
United States	$18,459	$1,161	$29	$5,109	$8,246	$3,350	$564
Alabama	216	0	0	68	89	48	11
Alaska	17	—	0	5	5	6	1
Arizona	138	26	0	31	57	22	2
Arkansas	99	1	0	30	41	24	3
California	1,933	145	0	498	821	457	12
Colorado	192	4	0	62	85	40	1
Connecticut	170	11	0	45	87	25	1
Delaware	2	0	0	1	1	—	—
District of Columbia	123	0	0	35	62	26	1
Florida	466	23	0	177	192	60	14
Georgia	255	37	0	57	100	33	27
Hawaii	49	12	0	9	18	8	2
Idaho	50	0	0	17	27	7	—
Illinois	1,576	11	—	526	739	247	53
Indiana	378	13	0	92	180	84	9
Iowa	130	0	0	34	57	36	2
Kansas	189	2	0	55	84	45	3
Kentucky	139	0	0	31	73	31	3
Louisiana	262	9	3	59	144	47	1
Maine	46	0	0	18	17	10	1
Maryland	169	2	0	46	79	36	5
Massachusetts	547	10	0	147	287	98	5
Michigan	597	46	3	147	253	116	31
Minnesota	364	15	0	118	147	77	6
Mississippi	93	6	0	24	61	1	—
Missouri	390	26	0	107	157	90	10
Montana	50	1	0	18	19	12	—
Nebraska	156	3	—	42	62	45	4
Nevada	41	0	0	17	16	5	3
New Hampshire	50	—	0	10	27	11	1
New Jersey	537	28	—	152	254	91	12
New Mexico	56	0	0	19	19	7	11
New York	3,151	569	20	800	1,198	390	174
North Carolina	161	15	0	39	86	20	1
North Dakota	42	1	0	13	17	10	—
Ohio	826	27	—	232	410	153	4
Oklahoma	325	18	—	88	127	87	4
Oregon	201	0	0	71	78	45	7
Pennsylvania	1,439	31	1	302	778	257	69
Rhode Island	60	—	0	16	31	12	0
South Carolina	87	0	—	21	49	15	1
South Dakota	48	—	0	16	20	11	—
Tennessee	324	19	—	79	152	65	9
Texas	1,261	42	0	425	544	210	40
Utah	58	0	0	19	29	10	0
Vermont	25	—	1	7	10	6	1
Virginia	299	2	0	91	151	54	2
Washington	282	0	0	81	120	78	3
West Virginia	107	0	0	25	54	23	5
Wisconsin	238	2	0	78	106	43	8
Wyoming	39	1	0	6	20	12	1
Virgin Islands	2	0	0	—	1	1	—
D.C.—all*	200	13	0	48	97	41	1

* Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 16

Status of applications for national bank charters, and charters issued, January 1-March 31, 1967

Applications carried over from December 31, 1966	24
4 Conversions	
20 Primary	
Applications received January 1-March 31, 1967	14
7 Conversions	
7 Primary	
	38
Applications approved January 1-March 31, 1967	4
2 Conversions	
2 Primary	
Applications rejected January 1-March 31, 1967	16
1 Conversion	
15 Primary	
Applications abandoned January 1-March 31, 1967	0
0 Conversions	
0 Primary	
Applications pending March 31, 1967	18
8 Conversions	
10 Primary	
	38
* * *	
National banks chartered January 1-March 31, 1967	9
3 Conversions	
6 Primary	

TABLE 17

Status of applications for national bank charters* and charters issued,* by states, January 1-March 31, 1967

	Received†	Approved	Rejected	Abandoned	Pending March 31, 1967	Charters issued
United States	27	2	15	0	10	6
Alabama	1	0	0	0	1	0
Alaska	0	0	0	0	0	0
Arizona	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0
California	0	0	0	0	0	0
Colorado	0	0	0	0	0	1
Connecticut	0	0	0	0	0	0
Delaware	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0
Florida	4	0	3	0	1	2
Georgia	3	1	2	0	0	1
Hawaii	0	0	0	0	0	0
Idaho	0	0	0	0	0	0
Illinois	2	0	1	0	1	0
Indiana	0	0	0	0	0	0
Iowa	0	0	0	0	0	0
Kansas	1	0	0	0	1	0
Kentucky	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0
Maine	0	0	0	0	0	0
Maryland	0	0	0	0	0	0
Massachusetts	1	0	1	0	0	0
Michigan	2	0	1	0	1	0
Minnesota	2	0	1	0	1	0
Mississippi	0	0	0	0	0	0
Missouri	0	0	0	0	0	0
Montana	0	0	0	0	0	0
Nebraska	1	0	0	0	1	0
Nevada	0	0	0	0	0	0
New Hampshire	1	0	0	0	1	0
New Jersey	1	0	1	0	0	0
New Mexico	0	0	0	0	0	0
New York	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0
Ohio	2	0	1	0	1	0
Oklahoma	0	0	0	0	0	0
Oregon	0	0	0	0	0	0
Pennsylvania	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0
South Carolina	0	0	0	0	0	1
South Dakota	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0
Texas	2	0	2	0	0	0
Utah	0	0	0	0	0	0
Vermont	0	0	0	0	0	0
Virginia	1	0	0	0	1	0
Washington	2	1	1	0	0	0
West Virginia	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	1
Wyoming	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0
Puerto Rico	1	0	1	0	0	0

* Excludes conversions.
† Includes 20 applications pending as of December 31, 1966.

TABLE 18

Status of applications for conversion to national bank charters, and charters issued, by states, January 1-March 31, 1967

	Received *	Approved	Rejected	Abandoned	Pending March 31, 1967	Charters issued
United States	11	2	1	0	8	3
Alabama	0	0	0	0	0	0
Alaska	0	0	0	0	0	0
Arizona	0	0	0	0	0	0
Arkansas	1	0	0	0	1	0
California	0	0	0	0	0	0
Colorado	2	1	0	0	1	1
Connecticut	0	0	0	0	0	0
Delaware	0	0	0	0	0	0
District of Columbia	0	0	0	0	0	0
Florida	0	0	0	0	0	0
Georgia	0	0	0	0	0	0
Hawaii	0	0	0	0	0	0
Idaho	0	0	0	0	0	0
Illinois	0	0	0	0	0	1
Indiana	1	0	0	0	1	0
Iowa	0	0	0	0	0	0
Kansas	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0
Maine	0	0	0	0	0	0
Maryland	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0
Michigan	0	0	0	0	0	0
Minnesota	1	0	0	0	1	0
Mississippi	0	0	0	0	0	0
Missouri	0	0	0	0	0	0
Montana	4	0	0	0	4	0
Nebraska	1	1	0	0	0	1
Nevada	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0
New Jersey	0	0	0	0	0	0
New Mexico	0	0	0	0	0	0
New York	0	0	0	0	0	0
North Carolina	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0
Ohio	1	0	1	0	0	0
Oklahoma	0	0	0	0	0	0
Oregon	0	0	0	0	0	0
Pennsylvania	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0
Tennessee	0	0	0	0	0	0
Texas	0	0	0	0	0	0
Utah	0	0	0	0	0	0
Vermont	0	0	0	0	0	0
Virginia	0	0	0	0	0	0
Washington	0	0	0	0	0	0
West Virginia	0	0	0	0	0	0
Wisconsin	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0

* Includes four applications pending as of December 31, 1966.

TABLE 19

Status of de novo branch applications of national banks, by states, January 1-March 31, 1967

	Received*	Approved	Rejected	Abandoned	Pending March 31, 1967
United States	462	99	69	18	276
Alabama	6	1	0	1	4
Alaska	1	0	0	0	1
Arizona	6	1	3	0	2
Arkansas	1	1	0	0	0
California	70	14	18	1	37
Colorado	0	0	0	0	0
Connecticut	4	3	0	0	1
Delaware	0	0	0	0	0
District of Columbia	1	0	1	0	0
Florida	0	0	0	0	0
Georgia	4	1	0	1	2
Hawaii	0	0	0	0	0
Idaho	2	1	0	0	1
Illinois	13	4	0	0	9
Indiana	10	5	2	0	3
Iowa	0	0	0	0	0
Kansas	3	0	0	0	3
Kentucky	4	2	0	1	1
Louisiana	2	0	0	0	2
Maine	3	2	1	0	0
Maryland	18	2	6	2	8
Massachusetts	14	9	2	0	3
Michigan	31	6	7	2	16
Minnesota	0	0	0	0	0
Mississippi	6	2	0	0	4
Missouri	1	0	0	0	1
Montana	0	0	0	0	0
Nebraska	0	0	0	0	0
Nevada	1	1	0	0	0
New Hampshire	7	1	3	2	1
New Jersey	18	3	0	1	14
New Mexico	0	0	0	0	0
New York	58	5	6	0	47
North Carolina	10	2	0	1	7
North Dakota	3	1	1	0	1
Ohio	25	9	1	3	12
Oklahoma	3	2	0	0	1
Oregon	6	1	1	0	4
Pennsylvania	28	7	10	0	11
Rhode Island	1	0	0	0	1
South Carolina	5	3	1	0	1
South Dakota	2	1	0	0	1
Tennessee	2	0	0	1	1
Texas	0	0	0	0	0
Utah	3	1	0	1	1
Vermont	0	0	0	0	0
Virginia	15	4	4	0	7
Washington	14	4	2	1	7
West Virginia	0	0	0	0	0
Wisconsin	61	0	0	0	61
Wyoming	0	0	0	0	0
Virgin Islands	0	0	0	0	0
D.C.—all†	1	0	1	0	0

* Includes 263 applications pending as of December 31, 1966.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

TABLE 20

Branches of national banks: in operation December 31, 1966; opened, discontinued, or consolidated, January 1-March 31, 1967; and branches in operation March 31, 1967

	Branches in operation Dec. 31, 1966	De novo branches opened for business Jan. 1-Mar. 31, 1967	Branches acquired through merger or conversion Jan. 1-Mar. 31, 1967	Existing branches discontinued or consolidated Jan. 1-Mar. 31, 1967	Branches in operation Mar. 31, 1967
United States	9,406*	115	43	5	9,559
Alabama	137	6	0	0	143
Alaska	42	0	0	0	42
Arizona	182	0	0	0	182
Arkansas	62	2	0	0	64
California	1,791	31	4	1	1,825
Colorado	0	0	0	0	0
Connecticut	179	0	0	0	179
Delaware	4	0	0	0	4
District of Columbia	53	0	0	0	53
Florida	0	0	0	0	0
Georgia	127	3	0	0	130
Hawaii	41	0	0	0	41
Idaho	101	0	0	0	101
Illinois	0	0	0	0	0
Indiana	267	6	0	0	273
Iowa	38	0	0	0	38
Kansas	25	0	0	0	25
Kentucky	120	0	0	0	120
Louisiana	145	1	0	1	145
Maine	71	1	0	0	72
Maryland	196	3	0	0	199
Massachusetts	351	5	2	0	358
Michigan	459	8	1	0	468
Minnesota	6	0	0	0	6
Mississippi	96	3	4	0	103
Missouri	19	0	0	0	19
Montana	0	0	0	0	0
Nebraska	18	0	0	0	18
Nevada	36	0	0	0	36
New Hampshire	26	1	0	0	27
New Jersey	459	5	10	1	473
New Mexico	54	2	0	0	56
New York	1,015	8	1	0	1,024
North Carolina	275	6	3	2	282
North Dakota	8	0	0	0	8
Ohio	570	3	1	0	574
Oklahoma	27	0	0	0	27
Oregon	217	1	0	0	218
Pennsylvania	840	6	5	0	851
Rhode Island	54	1	0	0	55
South Carolina	191	4	1	0	196
South Dakota	42	1	0	0	43
Tennessee	226	4	1	0	231
Texas	0	0	0	0	0
Utah	55	0	0	0	55
Vermont	33	0	3	0	36
Virginia	369	2	6	0	377
Washington	352*	2	1	0	355
West Virginia	0	0	0	0	0
Wisconsin	24	0	0	0	24
Wyoming	0	0	0	0	0
Virgin Islands	3	0	0	0	3
D.C.—all †	89	0	0	0	89

* Revised.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

TABLE 21

De novo branches of national banks opened for business, by community size and by size of bank, January 1-March 31, 1967

Category	Branches
In cities with population:	
Less than 5,000	31
5,000 to 24,999	38
25,000 to 49,999	13
50,000 to 99,999	7
100,000 to 249,999	10
250,000 to 499,999	9
500,000 to 1,000,000	3
Over 1,000,000	4
TOTAL	115
By banks with total resources: (in millions of dollars)	
Less than $ 10.0	25
10.0 to 24.9	20
25.0 to 49.9	7
50.0 to 99.9	3
100.0 to 999.9	33
Over 1,000.0	27
TOTAL	115

TABLE 22

Mergers,* January 1-March 31, 1967

Applications carried over from December 31, 1966	14
Applications received January 1-March 31, 1967	13
Disposition of applications: January 1-March 31, 1967	
Approved	14
Disapproved	0
Withdrawn	2
Pending March 31, 1967	11
Transactions completed	19
Mergers	13
Consolidations	2
Purchase of assets	4

The aggregate totals of capital stock and capital accounts for certificates issued are as follows:

	Charter or purchasing banks	Merging, consol., or selling banks	Combined
Capital stock	$ 48,902,910	$ 9,170,575	$ 58,794,605
Capital accounts	149,220,034	29,579,122	169,717,812

* Includes mergers, consolidations and purchase and sale transactions where the resulting bank is a national bank.

TABLE 23

Selected loans and discounts of national banks, by states, December 31, 1966
(Dollar amounts in millions)

	Loans secured by real estate	Loans to financial institutions	Loans to purchase or carry securities	Commercial and industrial loans	Personal loans to individuals
United States	$30,341	$8,875	$4,272	$50,430	$27,988
Alabama	216	62	23	453	488
Alaska	61	—	—	50	35
Arizona	282	39	50	337	293
Arkansas	144	22	16	184	183
California	5,540	1,043	237	6,765	3,368
Colorado	273	105	28	385	357
Connecticut	380	24	25	355	357
Delaware	6	0	0	2	4
District of Columbia	280	133	9	247	190
Florida	560	155	113	990	890
Georgia	326	130	21	680	572
Hawaii	117	6	5	60	53
Idaho	137	9	13	84	112
Illinois	1,799	1,203	537	5,286	1,740
Indiana	813	163	43	656	710
Iowa	220	29	14	190	188
Kansas	141	48	12	320	232
Kentucky	219	45	9	229	255
Louisiana	244	127	49	670	359
Maine	89	9	2	86	84
Maryland	354	79	22	368	313
Massachusetts	496	298	34	1,879	759
Michigan	1,942	360	113	1,311	1,175
Minnesota	647	170	67	912	504
Mississippi	105	18	12	223	174
Missouri	467	272	47	897	526
Montana	101	4	2	81	102
Nebraska	116	34	36	258	188
Nevada	91	8	10	70	78
New Hampshire	78	17	3	109	113
New Jersey	1,666	136	75	932	1,070
New Mexico	78	19	6	124	113
New York	3,539	1,830	1,650	11,455	2,607
North Carolina	181	74	20	489	373
North Dakota	97	3	2	66	65
Ohio	1,654	336	136	1,504	1,753
Oklahoma	299	93	12	723	417
Oregon	419	106	19	646	332
Pennsylvania	2,357	493	115	3,410	1,875
Rhode Island	254	32	20	124	85
South Carolina	78	35	8	189	214
South Dakota	94	7	1	75	66
Tennessee	315	157	51	849	729
Texas	816	501	465	3,451	1,866
Utah	163	28	23	132	77
Vermont	89	—	2	38	57
Virginia	620	109	44	550	732
Washington	514	187	34	841	500
West Virginia	178	15	5	110	190
Wisconsin	610	97	29	505	412
Wyoming	61	3	3	70	51
Virgin Islands	13	—	0	6	3
D.C.—all*	427	212	27	341	348

* Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 24

Income and expenses of national banks, by states, year ended December 31, 1966
(Dollar amounts in millions)

	Number of banks*	Current operating revenue								
		Interest and dividends on securities			Interest and discount on loans	Service charges		Other charges, commissions, and fees	Trust department	Other current operating revenue
		Total current operating revenue	U. S. Government obligations	Other securities		On bank loans	On deposit accounts			
United States	4,799	$11,305	$1,232	$901	$7,578	$135	$532	$195	$395	$337
Alabama	87	131	19	11	84	1	8	2	4	2
Alaska	5	18	2	1	12	1	2	1	—	—
Arizona	4	105	7	6	75	2	8	3	3	2
Arkansas	67	55	7	5	37	—	3	1	1	1
California	91	1,602	119	119	1,098	31	108	23	45	59
Colorado	117	130	14	7	85	2	9	2	8	4
Connecticut	30	111	7	8	75	1	7	2	8	2
Delaware	5	1	—	—	1	—	—	—	0	—
District of Columbia	9	81	15	2	50	2	4	1	4	2
Florida	198	285	43	26	169	5	18	5	11	8
Georgia	58	167	13	9	114	3	12	7	6	3
Hawaii	2	25	2	2	17	1	1	—	1	1
Idaho	9	40	4	3	28	1	3	1	—	1
Illinois	422	922	125	83	604	7	24	12	43	25
Indiana	123	242	39	16	153	3	11	5	8	7
Iowa	102	76	12	6	49	—	4	2	2	1
Kansas	170	96	17	8	60	—	5	2	2	2
Kentucky	80	74	12	6	49	1	3	1	2	2
Louisiana	47	136	22	11	89	1	7	3	2	3
Maine	21	27	3	2	18	—	1	—	1	1
Maryland	49	104	12	6	70	3	6	1	3	3
Massachusetts	90	319	23	18	216	3	16	16	16	11
Michigan	99	457	60	35	313	4	17	8	13	7
Minnesota	194	231	28	19	151	2	9	9	10	3
Mississippi	36	56	7	5	36	—	2	2	1	1
Missouri	98	196	24	15	134	1	5	2	10	5
Montana	49	36	5	3	23	1	3	1	—	—
Nebraska	126	86	11	6	59	—	5	2	3	2
Nevada	3	28	3	2	18	1	2	—	1	1
New Hampshire	52	29	3	1	20	—	2	—	1	1
New Jersey	148	353	41	37	229	4	20	5	11	7
New Mexico	34	41	5	2	27	—	3	1	1	1
New York	190	1,665	112	137	1,170	17	47	24	66	91
North Carolina	27	108	9	9	71	4	6	3	3	1
North Dakota	42	30	5	3	19	—	2	1	—	—
Ohio	226	489	70	42	318	4	22	5	15	12
Oklahoma	220	163	25	12	106	2	9	2	3	3
Oregon	13	151	15	11	103	2	13	2	4	2
Pennsylvania	354	748	88	68	496	7	21	8	38	22
Rhode Island	4	44	3	5	30	1	2	1	2	1
South Carolina	26	54	6	3	36	—	4	2	2	1
South Dakota	34	36	6	2	23	—	2	1	1	—
Tennessee	77	185	24	14	127	2	7	4	5	2
Texas	546	680	84	59	458	7	27	10	19	17
Utah	13	41	3	4	28	1	3	1	1	1
Vermont	27	17	2	1	12	—	1	—	—	—
Virginia	114	192	22	13	131	3	10	3	7	3
Washington	28	211	20	14	139	3	17	6	7	5
West Virginia	80	52	12	4	32	—	2	1	1	1
Wisconsin	112	153	19	15	101	1	6	3	4	3
Wyoming	40	24	4	1	16	—	1	1	—	—
Virgin Islands	1	2	—	—	1	—	—	—	0	—
D.C.—All †	14	127	22	4	81	2	7	1	7	3

* Number of banks at end of year; data, however, includes banks which were in operation part of the year but inactive at the close of the year.
† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 24a

Income and expenses of national banks, by states, year ended December 31, 1966 (Dollar amounts in millions)

	Current operating expenses												
	Total current operating expenses	Salaries and wages				Officer and employee benefits	Fees to directors	Interest on time and savings deposits	Interest and discount on borrowed money	Net occupancy expense of bank premises	Furniture and equipment depreciation and other costs	Other current operating expenses	Net current operating earnings
		Officers		Employees other than officers									
		Amount	Number	Amount	Number								
ited States	$8,492	$823	72,092	$1,490	346,817	$351	$40	$3,733	$54	$450	$271	$1,280	$2,814
bama	93	11	1,037	19	5,148	4	1	34	—	5	4	15	38
ska	14	2	127	3	632	1	—	5	—	1	1	2	4
ona	84	9	811	17	3,993	3	—	34	—	5	4	12	21
ansas	40	6	566	7	2,006	2	—	14	—	2	2	7	15
ifornia	1,277	122	11,399	224	47,693	46	1	636	4	70	37	138	325
orado	102	12	1,059	18	4,379	4	1	39	—	7	5	16	28
necticut	85	10	825	19	4,259	5	1	26	—	6	4	14	26
aware	1	—	18	—	73	—	—	—	—	—	—	—	—
trict of Columbia	55	7	468	11	2,292	2	—	22	—	3	2	8	25
rida	222	25	2,253	42	10,798	8	2	84	2	12	10	38	63
rgia	127	14	1,121	26	6,084	7	1	38	1	8	5	26	40
aii	19	2	207	3	796	1	—	7	0	1	1	3	6
o	29	4	346	6	1,498	1	—	11	0	1	1	5	11
ois	663	56	4,320	105	22,951	28	3	326	4	27	18	96	259
ana	177	20	1,730	33	8,045	7	1	64	—	10	7	34	65
a	56	9	764	10	2,521	2	—	20	—	3	2	10	20
as	64	11	1,042	11	2,773	3	1	23	—	3	3	10	32
tucky	52	7	732	10	2,884	2	1	18	—	3	2	9	22
siana	96	10	887	18	4,393	4	1	34	2	6	4	18	40
ine	20	2	243	4	1,163	1	—	6	—	1	1	3	7
yland	74	8	742	16	3,880	3	1	25	—	5	3	14	30
sachusetts	217	23	1,884	52	11,807	11	1	64	4	14	8	39	102
higan	365	22	1,710	63	14,628	14	1	185	3	18	10	48	91
nesota	174	18	1,626	27	6,709	7	1	76	3	8	5	28	57
issippi	40	5	403	7	1,815	2	—	13	—	1	2	9	16
souri	137	14	1,156	26	6,270	5	1	51	1	7	5	28	58
tana	27	4	356	4	1,045	1	—	10	—	1	1	6	8
raska	61	10	928	10	2,710	3	1	21	—	3	3	10	25
da	21	3	272	4	989	1	—	8	—	1	1	3	8
Hampshire	21	3	289	4	1,089	1	—	6	—	1	1	4	8
Jersey	273	25	2,187	53	12,561	12	2	112	1	17	9	41	80
Mexico	30	4	369	6	1,536	1	—	9	—	2	1	5	11
York	1,277	76	5,475	207	42,099	62	2	647	5	69	25	184	388
th Carolina	83	10	918	16	4,623	4	—	29	1	5	3	13	25
th Dakota	23	3	295	3	845	1	—	11	—	1	1	3	7
	352	32	2,593	62	14,812	12	2	156	—	16	10	62	136
homa	117	18	1,718	19	4,976	5	1	43	2	6	5	19	46
on	120	15	1,495	21	4,909	4	—	56	—	6	4	14	31
sylvania	555	49	4,602	90	21,193	23	4	260	1	27	18	83	193
e Island	34	2	193	5	1,283	2	—	19	—	1	1	4	9
th Carolina	37	6	596	11	3,113	2	—	6	—	2	2	7	18
th Dakota	26	4	391	4	1,083	1	—	11	—	1	1	3	10
essee	134	14	1,273	24	6,154	5	1	54	2	6	6	23	51
s	499	58	5,297	74	18,273	17	4	203	10	27	16	90	181
	30	2	252	4	1,178	1	—	16	—	1	1	4	11
ont	14	1	164	2	596	—	—	7	—	1	—	2	3
nia	143	17	1,628	26	6,957	6	1	60	1	7	5	22	49
ington	159	17	1,601	35	7,813	8	—	62	—	9	6	21	51
Virginia	36	5	464	6	1,563	1	—	15	—	2	1	6	16
onsin	115	12	998	19	5,130	4	1	51	1	6	4	16	38
ing	18	3	249	3	705	1	—	7	—	1	1	3	5
n Islands	2	—	13	—	92	—	—	1	—	—	—	—	1
—all†	86	9	675	17	3,616	3	1	33	—	5	3	15	41

cludes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.
: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 24b

Income expenses of national banks, by states, year ended December 31, 1966 (Dollar amounts in thousands)

	Recoveries, transfers from valuation reserves, and profits*							Losses, chargeoffs, and transfers to valuation reserve †						
		On securities			On loans				On securities			On loans		
	Total	Profits on securities sold or redeemed	Recoveries	Transfers from valuation reserves	Recoveries	Transfer from valuation reserves	All other	Total	Losses on securities sold	Charge-offs on securities not sold	Transfers to valuation reserves	Charge-offs	Transfers to valuation reserves	All other
United States	$228,598	$37,999	$3,353	$79,483	$7,179	$40,162	$60,422	$852,572	$252,488	$4,715	$53,501	$15,105	$435,497	$91,266
Alabama	1,228	530	0	133	99	55	411	10,845	3,358	43	73	123	6,213	1,035
Alaska	437	2	0	0	0	0	435	2,185	913	0	0	160	997	115
Arizona	347	36	0	168	0	0	143	9,931	2,393	0	463	0	6,613	462
Arkansas	715	264	2	58	167	121	103	4,048	599	73	16	154	2,655	551
California	13,965	9,154	0	15	424	149	4,223	96,970	20,448	3	12,619	1,372	50,219	12,309
Colorado	2,350	149	38	1,286	147	47	683	9,404	3,061	181	81	740	4,426	915
Connecticut	1,444	104	0	297	5	326	712	8,557	1,862	1	37	26	4,065	2,566
Delaware	13	1	0	0	12	0	0	52	18	1	0	24	0	9
District of Columbia	1,048	229	0	0	7	3	809	3,092	216	0	28	37	2,162	649
Florida	2,592	384	31	61	184	333	1,599	20,658	3,077	14	44	1,106	14,174	2,243
Georgia	2,146	657	0	26	23	443	997	12,461	1,142	9	435	26	8,555	2,294
Hawaii	760	345	0	0	0	0	415	1,867	456	0	0	0	1,050	361
Idaho	61	13	3	28	11	0	6	2,656	1,414	2	0	25	1,129	86
Illinois	31,960	1,776	591	14,141	341	5,524	9,587	88,436	33,486	786	11,135	741	30,914	11,374
Indiana	4,025	761	11	1,858	136	195	1,064	22,243	4,436	159	2,249	364	12,285	2,750
Iowa	693	232	110	5	27	134	185	4,753	876	33	23	83	2,820	918
Kansas	901	233	2	66	264	68	268	6,519	1,313	89	69	369	4,048	631
Kentucky	1,583	163	26	282	60	674	378	5,809	595	76	483	140	3,420	1,095
Louisiana	6,182	456	2	955	91	60	4,618	9,712	1,396	120	364	215	6,590	1,027
Maine	269	34	1	48	32	0	154	1,913	449	10	48	17	858	531
Maryland	1,240	117	10	2	49	4	1,058	9,860	2,366	37	503	71	5,647	1,236
Massachusetts	4,654	575	50	1,050	146	430	2,403	25,479	3,875	25	4,301	56	13,005	4,217
Michigan	11,482	407	10	8,660	47	316	2,042	35,532	14,289	32	234	62	19,144	1,774
Minnesota	3,040	282	803	542	224	29	1,160	17,511	7,618	164	35	366	7,914	1,414
Mississippi	954	171	30	101	90	202	360	6,934	385	45	1,428	67	4,297	712
Missouri	11,444	723	17	4,770	99	1,817	4,018	19,727	6,809	190	529	665	8,134	3,400
Montana	2,232	77	124	309	216	1,039	467	2,550	929	19	180	300	745	377
Nebraska	2,389	228	564	1,113	78	176	230	8,079	2,930	618	213	74	3,182	1,062
Nevada	278	11	0	0	0	0	267	1,853	35	0	0	0	1,503	315
New Hampshire	526	229	2	53	20	34	188	2,049	297	79	0	54	1,338	281

TABLE 24b (Cont.)

Income expenses of national banks, by states, year ended December 31, 1966 (Dollar amounts in thousands)

	Recoveries, transfers from valuation reserves, and profits*							Losses, chargeoffs, and transfers to valuation reserve †						
		On securities			On loans				On securities			On loans		
	Total	Profits on securities sold or redeemed	Recoveries	Transfers from valuation reserves	Recoveries	Transfer from valuation reserves	All other	Total	Losses on securities sold	Charge-offs on securities not sold	Transfers to valuation reserves	Charge-offs	Transfers to valuation reserves	All other
New Jersey	2,945	1,062	141	244	99	777	622	21,383	6,778	65	622	295	11,101	2,522
New Mexico	864	125	0	0	50	39	650	3,307	1,100	11	0	73	1,659	464
New York	12,093	2,951	11	730	342	3,096	4,963	135,764	52,150	269	337	334	74,532	8,142
North Carolina	1,412	581	0	590	8	151	82	9,080	2,513	60	13	17	4,533	1,944
North Dakota	354	46	117	0	36	0	155	1,704	918	52	0	3	576	155
Ohio	9,416	1,092	14	4,271	203	2,013	1,823	34,703	10,257	170	3,827	305	17,359	2,785
Oklahoma	2,978	1,311	91	380	756	177	263	12,567	2,313	101	274	1,501	7,706	672
Oregon	882	97	0	0	25	0	760	8,635	1,855	0	0	113	5,157	1,510
Pennsylvania	58,577	2,161	267	33,212	614	16,702	5,621	57,642	25,179	182	3,666	722	22,979	4,914
Rhode Island	1,475	10	0	580	2	800	83	3,571	1,186	4	120	53	1,934	274
South Carolina	311	97	18	34	7	10	145	2,012	212	5	29	8	1,502	256
South Dakota	239	27	108	0	11	41	52	2,283	1,304	6	7	24	814	128
Tennessee	6,033	3,828	36	521	32	651	965	14,035	5,572	524	446	89	5,966	1,438
Texas	7,224	1,640	34	726	1,524	1,405	1,895	46,102	7,314	311	4,794	3,432	26,037	4,214
Utah	122	13	0	0	38	5	66	4,223	1,649	0	0	70	2,115	389
Vermont	275	97	0	1	10	16	151	702	213	19	0	10	410	50
Virginia	3,287	422	21	1,817	139	68	820	17,131	2,725	15	2,975	248	9,371	1,797
Washington	3,431	785	23	307	72	1,570	674	16,384	5,596	3	619	85	7,906	2,175
West Virginia	1,494	467	14	15	125	153	720	2,251	397	36	145	160	1,213	300
Wisconsin	3,982	2,822	8	28	15	301	808	5,841	1,994	64	10	21	3,455	297
Wyoming	238	22	23	0	72	8	113	1,514	222	9	27	105	1,025	126
Virgin Islands	8	0	0	0	0	0	8	53	0	0	0	0	48	5
D.C.—all‡	1,103	259	1	0	14	3	1,103	6,094	368	0	28	65	4,834	799

* Not including recoveries credited to valuation reserves.
† Not including losses charged to valuation reserves.
‡ Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

TABLE 24c

Income and expenses of national banks, by states, year ended December 31, 1966
(Dollar amounts in millions)

	Net income before related taxes	Taxes on net income		Net income before dividends	Cash dividends declared			Net income after dividends	Capital accounts*	Ratios	
		Federal	State		On common stock	On preferred stock	Total cash dividends declared			Net income before dividends to capital accounts (percent)	Total current operating expenses to total current operating revenue (percent)
United States	$2,190	$546	$61	$1,583	$737	$1	$738	$845	$17,971	8.81	75.11
Alabama	29	9	1	19	9	0	9	10	209	8.85	70.79
Alaska	2	—	—	2	—	0	—	1	16	12.02	78.25
Arizona	12	3	—	8	6	0	6	3	137	6.19	79.82
Arkansas	12	3	0	9	3	0	3	6	95	9.24	72.75
California	242	53	25	163	95	0	95	69	1,898	8.61	79.75
Colorado	21	5	1	15	8	0	8	8	187	8.17	78.29
Connecticut	19	4	2	14	7	0	7	6	166	8.17	76.19
Delaware	—	—	—	—	—	0	—	—	2	6.74	84.92
District of Columbia	23	10	0	13	6	0	6	7	111	11.82	68.64
Florida	45	11	0	34	13	0	13	21	452	7.55	77.82
Georgia	30	9	0	21	9	0	9	12	249	8.33	75.91
Hawaii	5	2	—	3	2	0	2	1	47	5.96	76.99
Idaho	9	3	1	5	3	0	3	2	49	10.81	71.91
Illinois	203	60	0	143	59	—	59	84	1,523	9.36	71.87
Indiana	47	15	0	32	13	0	13	20	367	8.76	73.08
Iowa	16	5	0	11	4	0	4	7	126	8.87	73.28
Kansas	26	8	1	18	6	0	6	11	182	9.66	66.86
Kentucky	18	5	0	13	5	0	5	8	136	9.37	70.38
Louisiana	36	10	0	26	8	—	8	18	250	10.38	70.69
Maine	5	1	0	4	2	0	2	2	45	8.43	74.29
Maryland	21	7	0	14	7	0	7	7	165	8.54	71.03
Massachusetts	81	25	6	50	26	0	26	24	535	9.29	67.96
Michigan	67	9	0	59	20	—	20	38	569	10.34	79.98
Minnesota	43	9	4	29	15	0	15	14	355	8.27	75.35
Mississippi	10	3	0	8	4	0	4	4	89	8.69	70.85
Missouri	50	13	1	36	14	0	14	21	377	9.42	70.16
Montana	8	2	0	6	4	0	4	2	48	12.30	76.56
Nebraska	19	6	0	14	6	0	6	7	152	8.95	70.98
Nevada	6	2	0	4	2	0	2	2	41	10.15	73.23
New Hampshire	6	2	0	4	2	0	2	3	48	9.09	72.48
New Jersey	62	12	0	50	22	0	22	28	518	9.57	77.35
New Mexico	8	3	0	6	2	0	2	3	54	10.50	73.30
New York	264	42	12	210	111	1	112	98	3,111	6.76	76.71
North Carolina	18	4	1	13	7	0	7	5	158	7.92	76.60
North Dakota	6	1	—	4	2	0	2	2	41	10.17	77.15
Ohio	110	32	0	79	35	0	35	43	792	9.93	72.21
Oklahoma	36	11	1	25	13	0	13	12	319	7.78	71.75
Oregon	23	5	2	16	10	0	10	7	197	8.20	79.67
Pennsylvania	194	32	0	162	61	0	61	101	1,398	11.57	74.23
Rhode Island	7	—	—	7	3	0	3	4	58	11.61	78.27
South Carolina	16	6	—	10	4	—	4	5	84	11.39	67.76
South Dakota	8	3	—	5	2	0	2	3	47	11.11	72.20
Tennessee	43	14	0	29	10	—	10	19	311	9.41	72.32
Texas	142	42	0	100	51	0	51	48	1,234	8.09	73.38
Utah	7	1	—	5	4	0	4	2	58	9.14	73.43
Vermont	3	1	—	2	1	—	1	1	25	8.03	80.99
Virginia	35	10	0	26	13	0	13	12	290	8.71	74.50
Washington	39	13	0	25	12	0	12	13	276	9.19	75.52
West Virginia	16	6	0	10	3	0	3	7	103	9.60	68.49
Wisconsin	36	12	2	22	9	0	9	13	230	9.57	75.31
Wyoming	4	1	0	3	2	0	2	1	38	7.29	77.33
Virgin Islands	—	—	0	—	0	0	0	—	2	8.43	75.34
D.C.—all†	36	15	0	20	10	0	10	10	194	10.42	68.01

* This includes the aggregate book value of capital stock, surplus, undivided profits and reserves. These are averages of data from the Reports of Condition of the previous December and the current June and December of the respective year.

† Includes national and nonnational banks in the District of Columbia, all of which are supervised by the Comptroller of the Currency.

Note: Data may not add to totals because of rounding. Dashes indicate amounts less than $500,000.

TABLE 25

Assets and liabilities of foreign branches of national banks, December 31, 1966: consolidated statement
(Dollar amounts in thousands)

ASSETS		LIABILITIES	
Cash and cash items	$ 162,580	Total demand deposits	$1,627,502
Due from banks (time and demand)	1,083,643	Total time deposits	5,298,744
Securities	273,090	U.S. Government deposits	232,066
Loans and discounts	3,905,699	Certified checks, officers checks, official checks	63,000
Customers' liability on acceptances	420,840	Total deposits	7,221,312
Bank premises and equipment	48,245		
Other assets	102,010	Other liabilities and borrowed funds	243,573
Due from head offices and branches (gross)	3,368,171	Liabilities on acceptances	421,038
		Due to head office and branches (gross, including capital)	1,478,355
Total	9,364,278	Total	9,364,278

TABLE 26

Foreign branches of national banks, 1955-1966

End of Year	Number of branches operated by national banks	National bank branches as a percentage of total foreign branches of U.S. banks	End of Year	Number of branches operated by national banks	National bank branches as a percentage of total foreign branches of U.S. banks
1955	85	76.6	1963	124	77.5
1960	93	75.0	1964	138	76.7
1961	102	75.6	1965	196	93.5
1962	111	76.6	1966	230	94.3

TABLE 27

Foreign branches of national banks, by region and country, December 31, 1966

Region and country	Number
Latin America	102
Argentina	18
Bahamas	3
Bolivia	1
Brazil	15
Chile	8
Colombia	6
Dominican Republic	5
Ecuador	2
El Salvador	1
Guatemala	2
Guyana	1
Honduras	1
Jamaica	1
Mexico	5
Nicaragua	1
Panama	15
Paraguay	2
Peru	4
Trinidad	3
Uruguay	2
Venezuela	4
Virgin Islands (British)	2
Continental Europe	34
Austria	1
Belgium	4
France	3
Germany	7
Greece	1
Italy	1
Netherlands	3
Switzerland	2
England	11
Ireland	1
Africa	2
Liberia	1
Nigeria	1
Near East	6
Dubai	1
Lebanon	3
Saudi Arabia	2
Far East	57
Hong Kong	8
India	8
Japan	12
Malaysia	5
Okinawa	2
Pakistan	3
Philippines	5
Singapore	8
Taiwan	2
Thailand	2
Viet-Nam	2
U.S. overseas areas and trust territories	29
Canal Zone	2
Guam	2
Puerto Rico	16
Truk Islands	1
Virgin Islands	8
Total	230

BOOK REVIEWS

National Economic Policy. By JAMES TOBIN. New Haven and London: Yale University Press, 1966. Pp. x + 211. $5.00.

This volume comprises essays composed over the course of 15 years, most of them in the later part of that period. They are notable for their lucidity, persuasiveness and accomplished mastery of language; and the mind behind them is notable for its broad vision and humanity. Most of them plead a cause, always openly, and this is in the tradition of "political economy."

The earlier essays are concerned with stating the case for a greater participation by the central government in our affairs than was acceptable to earlier doctrines. The case could not have been better stated.

We proceed to the analysis of specific objectives, especially that of economic growth (chapters 8 and 9). Some may think that the role of increasing consumption, as part of the growth pattern, is played down too much. Policy "must discourage consumption" (p. 85). "The second shift of resources that must be engineered is from private consumption to private investment" (p. 80). It must be remembered that business just will not make additional investment, unless it foresees a rising demand for end products, which, of course, include defense items and exports, but of which the main constituent is consumption. Incidentally, Professor Tobin has a splendid castigation (chapter 6) of cheeseparing on defense. In a transition from a regular 3 percent growth rate to a regular 5 percent one, which would be a spectacular change, a higher *proportion* of GNP would have to go to investment; but during the transition there would have to be some upward inflection of consumption simultaneously; otherwise, there would be no motive for the extra investment.

Monetary policy certainly has a part to play. To get a smooth adjustment, there has to be a very delicate balance in the mix of monetary and fiscal policies. Professor Tobin is right to condemn the idea that monetary policy can be earmarked for the adjustment of the external balance of payments, leaving the domestic business cycle and growth to be regulated by fiscal policy only.

In his essays on money and inflation, Professor Tobin is critical of the Federal Reserve System for having unduly hampered growth by its stringent policies. Doubtless he has some case, anyhow in relation to certain periods. But on the whole its bark in the form of severe warnings against inflation—it is the special duty of any central bank to be the watchdog—has been worse than its bite. The outside observer is more inclined to be envious of the United States for having its Federal Reserve, which has from time to time shown quite notable flexibility. An example was in the Winter of 1966-1967, which, however, is outside the period of this volume, when on the onset, not quite of a recession, but of a period of stagnation, it reversed engines with remarkable celerity and in remarkable degree.

The last "Part" of this book is concerned with the burning question of the U.S. external deficits and international liquidity. I have argued on repeated occasions that much too much fuss has been made by the experts of continental Europe about the U.S. deficits of the last decade; by and large the deficits have probably done more good than harm to the rest of the world, both by stimulating expansion there and providing an additional medium of reserve. No one has told us how else an additional medium would have been provided. Nothing could have been more disastrous for the rest of the world than if the U.S. had sought to cure its external deficit by active deflation, as many high-minded and distinguished economists in continental Europe have repeatedly advocated.

Nonetheless, as one who has participated much in these European discussions, I am rendered a little uneasy by Professor Tobin's forthright championship of his country in chapter 14. This essay (published in the *Review of Economics and Statistics*) would have been fine, if delivered in the Sorbonne where it might have provoked fury, but would also have provoked deep thought;

but if it was delivered in Harvard—is this what the footnote implies?—it could have given rise to undue complacency.

Professor Tobin does not refer to the main gravamen, which is that it does not seem right that the rest of the world should transfer, year by year, without any immediate payment, a rather large quantity of *real resources* to the richest country, which is what the U.S. deficits entail. But what about Marshall Aid? Did not the U.S. do precisely that the other way round? I agree. I think that some attitudes to the U.S. deficits show a great lack of gratitude and generous spirit; memories, alas, are short. But still, time goes on; there is the question of what will happen in the years ahead. According to my understanding, the sum total of the deficits, according to the Department of Commerce definition, which, however, grossly exaggerates them, has already over-topped Marshall Aid.

Doubtless the propaganda that has taken place has contained an admixture of nationalism, nastiness, anti-Americanism and other disagreeable ingredients. But that is not the full story. There are many perfectly honest-thinking, intelligent and decent continental Europeans, who may even be strongly pro-American, who believe that something is *amiss*.

Perhaps I ought, although reluctantly, since basically I agree with Professor Tobin, to take up one or two matters in this chapter. Professor Tobin makes the oft-repeated point that the European countries "could have taken various measures to correct and reverse chronic European payments surpluses" (p. 150). They could have done so by allowing a substantial degree of domestic price inflation, the idea of which they understandably dislike; they have had some inflation. They claim that there are no other possible measures open to them. Professor Tobin further argues that since "for almost ten years previously U.S. deficits were no problem . . . clearly it is a change in human attitude and public policy" that has induced the pressure. That is not necessarily so. The deficits became larger; and their cumulative nature makes a difference.

Professor Tobin writes (p. 158) that "many Europeans say that when they buy dollars they are importing inflation. It is hard to take this claim seriously. First of all, if acquisitions of dollars are inflationary, so are acquisitions of gold, and Europe shows no signs of saturation with gold." This point is wrongly taken. What the Europeans object to are the American deficits as such, *whether paid for in gold or dollars.* They particularly object to payment in dollars, only because this enables the U.S. to continue with its deficits uncorrected.

On page 159, Professor Tobin takes up a point especially associated with the name of Professor Kindleberger. The European "saver wants a liquid, safe, short-term asset. The investor needs long-term finance and seeks it in the United States." This may have some validity, but it does not cover the ground. The additions to the official holdings of dollars are not part of this mechanism.

Professor Tobin is not a safe guide on Eurodollars: "Eurodollars are substitutes for real dollars" (p. 188). Eurodollars *are* real dollars. They are deposits in some bank resident in the U.S. The Eurodollar market is not a market in some substitute currency; it is a *loan* market in which "real" dollars are lent and borrowed.

I take up these points because there is a sad lack of mutual understanding between the experts of the U.S. and those of continental Europe, of which the snail-like progress in the discussions of the Group of Ten is evidence. The whole world meanwhile is suffering from the gap in the communications between these two power centers. Professor Tobin's great width of understanding in general qualifies him preeminently to be a person to contribute toward filling that gap.

I was sorry to find so distinguished a scholar spelling autarky with a "ch" (p. 159). By its derivation, and also by its long-standing usage, "autarchy" means much the same as autocracy; it has nothing to do with self-sufficiency.

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Politics and the Regulatory Agencies. By William L. Cary. New York: McGraw-Hill, 1967. Pp. 149. $5.95.

Out of his experience as Chairman of the

Securities and Exchange Commission from 1961 to 1964, and his thoughtful study of the literature, William L. Cary has written a slim but important volume on *Politics and the Regulatory Agencies.*

Typically, scholarly writing about the regulatory process is by lawyers whose blinders make it hard for them to see the political-substantive policy aspects in their concern for court-like due process for litigants. Or it is political scientists, who are quick to endorse Presidential policy leadership and a strengthening of commission powers, while perhaps slower to heed the possibilities of administrative arbitrariness in their desire to see more tightly-integrated policy developed in the public interest. It is a distinctive quality of Cary's approach that it blends in exceptional fashion the legal and the political, the procedural and the substantive. This blend produces, for instance, a superlative chapter (pp. 90-122) on the technical-political mix of considerations in shepherding a bill (the Securities Act Amendments of 1964) through the legislative process. It also enables Mr. Cary to advance a step further the perennial discussion of Presidential and Congressional policy supervision of regulatory agencies. Carefully delineating the variety of possible modes and degrees of intervention by the Executive Office, Cary rejects both Emmette Redford's desire (shared by many political scientists) for Presidentially-established, definitive policy guides and Judge Henry Friendly's abhorrence of any Presidential guidance, no matter how subtle. In Cary's view, it is simply a fact of life that the regulatory commissions are:

> very much a part of the Federal government and affect our economy and American business so importantly that they should be subject to a general framework of national policy. (p. 20)
>
> I would amplify my positions by insisting that presidential policy be open. It need not always be publicly stated, but it should be a policy position which the White House should be prepared to publish if the occasion arises. (p. 25)

On the related question of separating the adjudicative and the policy-development functions of the agencies, Cary sides with the integrationists in the tradition of Landis and Davis. On the premise that authority and responsibility must be joined together, Cary fears that separation of functions would often result in frustration of policy directives set by the administrator when these reached the administrative court that Hector has proposed. Both rule-making and adjudication are necessary tools, in his view:

> Generally speaking, when its action affects the interests of a group, the agency takes the legislative route: rule making; when it affects the interests of identifiable individuals or business entities, the quasi-judicial route: adjudication. (p. 127)

As a statement of principles this is surely unexceptionable; however, it does not answer the criticism that many matters can be seen as falling under either heading (that is, the case of the moment may but illustrate a general problem for which there should be a rule), but that the commissions have rarely made adequate use of their rule-making powers. And to this comment, Cary could make the rejoinder that nothing prevents the commissions from emphasizing rule-making more within existing structure. In fact, he does join with Hector and other critics in deploring too-exclusive reliance upon judicial fact-finding techniques when broad policy decisions should rest upon expert economic analysis. The "techniques of direct and cross-examination," he writes, "the application of technical rules of evidence and the use of hearing examiners as the primary deciders unduly circumscribe and delay the policy making process." (p. 129)

There is but one question of the political process with which I would really take issue with the author. Reviewing the 1963-1964 occasion when the FCC had moved to limit the length and frequency of broadcast commercials by requiring that broadcasters adhere to the code of the National Association of Broadcasters, he says of the House's vote (at the instigation of the Commerce Committee) to remove the subject from FCC's jurisdiction that we cannot quarrel with the "power or propriety of Congress' expressing a negative view." Similarly, he approves the propriety (though not necessarily the substantive merits) of the Congressional action in superseding the FTC's proposed rules on cancer warnings in cigarette advertising with its own package-labelling rule.

With the legislative power, of course, we cannot quarrel. With the propriety, I think we can. Congress works through its committees, and the House Commerce Committee is not representative of consumer interests. This is demonstrable through the history of that committee's support of producer interests, narrowly defined, time after time in relationship to regulatory policy. The FCC's statutory mandate is to pursue the public interest, convenience and necessity; it must define that interest in order to do its job. Congress may appropriately write its *own* definition of the public interest, but should do so as a matter of broad principle rather than concrete instance—else why have the commissions at all? And manifestly—granting the difficulty of defining the public interest objectively—the House Commerce Committee was responding to private producer interests instead in the broadcast commercial and cigarette labelling cases. That is to say, in short, the legal power was there, the ethical legitimacy we should insist upon was not.

Apart from my unwillingness to be as deferential to the Congress as is Mr. Cary, I have only praise for the important analysis—and the readable style—that he has provided in his book. Any reader will improve his understanding of the regulatory agencies by perusal of it.

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Banking in the Early Stages of Industrialization: A Study in Comparative Economic History. By RONDO CAMERON with the collaboration of OLGA CRISP, HUGH T. PATRICK and RICHARD TILLY. New York: Oxford University Press, 1967. Pp. xv + 349. $6.50.

This thought-provoking book analyzes the histories of several successfully-industrialized countries in order to determine the role played by the banking system during "that transitional period in which manufacturing industries . . . adopt new, more capital-intensive techniques of production and grow rapidly relative to agriculture." (More accurately, the discussion is concerned with the roles of various financial intermediaries, emphasizing their financing of developing manufacturing industries.) These studies are then used to draw lessons in regard to the optimum financial structure for industrialization to serve as guides for currently-developing economies. The countries and years studied are: England (1750-1844), Scotland (1750-1845), France (1800-1870), Belgium (1800-1875), Germany—mainly Prussia (1815-1870), Russia (1860-1914), and Japan (1868-1914). The first four are by Cameron, and the others by Tilly, Crisp, and Patrick, respectively. There is a short theoretical introduction written by Cameron and Patrick, and a summary and conclusion section by Cameron in which the country studies are compared in order to draw messages for today's world.

As is to be expected, the country studies vary somewhat in interest and in detail of presentation. All are primarily involved with the rearrangement and analysis of material derived from secondary sources. However, some new data are presented, and several of the studies include material not generally available. They do provide useful descriptions of the nature and characteristics of the banking institutions, as well as some brief case histories of lending practices, though their limited length makes them more suggestive than conclusive. They lack the framework and detail of the excellent series of articles on this subject by Lance Davis, relating to the 19th-century United States.

The major difficulty in interpreting the country studies and the policy recommendations involves the theoretical underpinnings. Since in the nine papers most of the relevant points are touched on, the criticism is one of emphasis. The banking system is considered to perform three basic functions within an underdeveloped economy. First, banks are the key factor in monetizing the economy, drawing resources out of the subsistence sector as well as freeing specie to finance imports. Second, credit creation and forced savings are a means of reallocating real resources to entrepreneurs. Third, banks perform financial intermediation, mobilizing saved funds to those willing to invest, a process not involving credit creation. Insufficient clarification of these separable functions occasionally leads to some confusion in evaluating banking systems.

The distinction between the role of money as a means of payment and the use of credit

to reallocate resources is insufficiently drawn. Similarly, the differences between banks as credit creators and the role of banks and other financial intermediaries in increasing the quantity of saving and investment by more efficient transfers of savings to investors is frequently played down. It is certainly surprising that in a book about banking there is almost no mention of price levels, and one seldom knows whether growth has occurred in an inflationary or deflationary period. Very little is said about foreign exchange and capital imports, and the one country (Russia) for which they are emphasized has implications at variance with the concluding chapter. While forced savings is frequently mentioned, prices are not, the authors apparently believing that monetizing the economy brings forth real resources in perfectly elastic supply and that the real-bills doctrine is valid "sooner or later." Cameron and Patrick claim that the only losers from credit creation are "those entrepreneurs who do not or can not gain access to funds"—again in the long run, and assuming away cyclical fluctuations, which are apparently not related to domestic financial variables.

One drawback to the empirical studies is that not only is there little discussion of the role of capital formation in economic growth, but no information on savings and investment ratios is presented. It is not clear whether increased capital accumulation is necessary for growth or is a result of growth, although in the concluding chapter the latter position is apparently held.

The final chapter evaluates the contributions of banking systems to economic growth. Scotland is given a superior grade, Japan a good second, and France decidedly failing marks. In each case this reflects government policy, though it should be noted that in England and Germany the private sector was able to overcome the obstacles imposed by the government. The policy conclusions drawn by Cameron are: competition among banks should be "most unfettered" (from any government controls, including government monopoly of note issue); there should be no specie standards ("an outmoded and expensive fetish"); and local banks of issue are desirable (to habituate the populace to financial institutions in the early period of development, as well as to aid small-scale enterprises and agriculture). Central banks seem "unavoidable," but not "felicitous." Some ambiguity does exist in defining competition. In the United States, competition among banks is not precluded by central bank controls, so that Cameron's proposals are more radical than may at first seem. Similarly, his faith that without a specie standard and central banking neither the government nor the private sector will overexpand note issue may be questioned by some. Although his proposals may be sound for developing economies, it is hard to say that they follow from the country studies, or even that any one conclusion can be drawn from the varying cases examined. It would have been useful for more to have been said in this chapter about problems of optimum price behavior for growth, economic instability and monetary fluctuations, and appropriate exchange-rate regimes.

Although these reservations about the theoretical framework persist, the book as a whole is a stimulating foray into a somewhat ignored subject. For those concerned almost exclusively with the real aspects of economic development, the discussions of alternative financial structures and their impacts will be of great interest. For general economists, accustomed to thinking about financial structures in already-developed and monetized economies, the first and last chapters are most relevant. The country studies are convenient readings for economic historians interested in the growth of the European and Japanese economies.

STANLEY ENGERMAN

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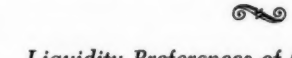

Liquidity Preferences of Commercial Banks. By GEORGE R. MORRISON. Chicago and London: The University of Chicago Press, 1966. Pp. v + 163. $7.50.

In this interesting, well-executed study, George Morrison analyzes the determinants of commercial-bank demand for excess reserves. The analysis is particularly concerned with the role of financial crises in the formation of bank expectations of future deposit drains. Morrison concludes that the huge stocks of excess reserves held subsequent to crises are mainly the result of banks' fear that they might be subjected to substantial

future deposit losses. He finds little or no evidence of an increased elasticity of demand for reserves at low rates of interest.

In the spirit of modern monetary analysis, the author asserts that bank demand for excess reserves is both rational and predictable. He views the stock of excess reserves as a buffer which acts to insulate bank earning assets from unexpected deposit losses. He argues that while excess reserves can represent an important source of liquidity, they must compete with other assets for a place in the total portfolio. The ratio of excess reserves to total deposits is taken to vary positively with the level of penalty costs associated with making up reserve deficiencies through borrowing. The ratio is also taken to vary negatively, both with the expected return on other assets and with the degree to which future deposit losses can be predicted—the less predictable are future deposit flows, the greater the desired ratio.

Although the author's framework is quite general, he chooses to focus his attention on the performance of various specifications of the model during and subsequent to periods of financial crisis. He lays special emphasis on bank behavior during the 1930's. This focus gives Morrison the opportunity to test various expectational hypotheses on data which are rich in change and which should evidence changing bank expectations.

Morrison's most successful attempt at quantifying bank deposit expectations is found in applying Friedman's technique for distinguishing between permanent and transitory components of a time series. The author argues that bank holdings of loans and other relatively-illiquid assets are influenced only by permanent (expected) deposit levels; transitory deposits influence holdings of excess reserves and other liquid assets. Banks use recent deposit histories to estimate expected deposits; during financial crises they tend to lengthen their forecast horizons and therefore to weight recent flows less heavily. This suggests that current deposit changes are viewed primarily as transitory and do not influence earning-assets holdings. Thus, after a financial crisis, reserve injections by the central bank are initially considered by commercial banks as transitory and are held in cash form.

Morrison provides an extended discussion of the empirical evidence for both American and Canadian banks. The experiences of the New York banks during the period 1872-1955 are used to illustrate the American case. Some of the most interesting results are found in various regression analyses of the behavior of these banks. Morrison finds that variations in transitory deposits exert an important influence on excess reserve holdings. He is able to do a good job of explaining the substantial rises in reserve holdings during depression on the basis of this variable. He finds little or no evidence of increases in the interest elasticity of demand for excess reserves at low interest rates.

By and large, one must credit Morrison with an interesting and informative treatment of the problem. However, his emphasis of the liquidity-trap hypothesis is regrettable. I thought this notion had long ago died a well-deserved death. Morrison, however, seems to believe that it is still a hot issue. He chooses to devote a large proportion of the book to demonstrating that public officials and academic economists alike in the 1930's believed that banks had an infinitely elastic demand for excess reserves at the prevailing interest rates. He then devotes another large chunk of the book to the task of refuting their mistaken hypothesis. There is certainly nothing new in Morrison's contention that the liquidity-preference function for banks shifts during depression. There is something new in his empirical explanation of the causes of the shifts. Apparently, because of his "hang-up" on the liquidity trap, Morrison deprives us of a more full-bodied analysis of his expectational hypotheses. Many questions are left unanswered. For example, can one improve upon a distributed-lag formulation of deposit expectations? Can the degree of change in the forecast horizon be estimated? One hopes that Morrison will address himself to these problems in future research.

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The Management of a Trust Department. By WALTER KENNEDY and PHILIP F. SEARLE. Boston: Bankers Publishing Company. Pp. 264. $15.00.

This book is a nicely-organized compila-

tion of the many factors that go into the management of a Trust Department. It is not concerned with substantive trust law, but rather, as the title indicates, with the planning, directing, and management functions of the trust executive.

Many of us in the trust business have labored long to pull together the assemblage of policies, principles, and procedures carefully laid out and organized by the authors. I wish we had had this book 15 years ago. The bank that is considering establishing a trust department or re-evaluating an existing department now has a very valuable blueprint to guide its thinking.

Kennedy and Searle first develop accounting and historical record-keeping requirements on an individual trust basis and then on a department-wide basis. From this they develop an analysis of the more specialized investment, tax, real estate, mortgage, administrative, and audit functions. The authors recognize that the organization of individual trust departments will depend on the particular personnel and emphasis of function of each department, so general organization is presented only to the extent of providing a basis for the discussion of the implementation, and control of implementation, of the different components of trust work. It should be pointed out that the authors concern themselves almost completely with personal trusts; pension and corporate trusts are only very briefly mentioned.

Of special merit are the two excellent chapters on development of new business and the achievement of adequate profitability. The allocation of funds to new business development has always been a particularly sticky problem for trust management. The authors, while not arbitrarily recommending any particular solution, present a good analysis of the popular rules of thumb and discuss the preparation and implementation of a new business budget. This chapter, in my opinion, is the high point of the book and by itself is well worth the price of admission. The discussion of a small trust department as an "instrumentality" rather than an "integral" part of the bank serves very nicely to put the matter of profitability in proper focus. Any trust executive who is having problems justifying his existence to his Directors would do well to read this material. Kennedy and Searle are to be complimented on the clarity and completeness of their analysis of the factors determining success or failure in these two very essential aspects of the operation of a trust shop.

The appendices range from sample forms of account work sheets to sample excerpts from the policy book now in use in a major trust institution; from the Statement of Principles adopted by the Trust Division of the American Bankers Association in 1933 and 1940, to the Statement of Principles between The Corporate Fiduciaries Association of New York City and The New York County Lawyers' Association.

The authors do not attempt to discuss such sophisticated management concepts as management by exception, utilization of computers, or most effective motivation of trust personnel which become increasingly important as the size of a trust operation increases. The book is essentially valuable for the executive in charge of a small- to medium-size trust operation. Larger departments demand a degree of organizational complexity, management sophistication and control in greater depth than is spelled out by Kennedy and Searle, but any trust executive in any size department would benefit from the overall review of trust department responsibilities that this book presents.

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Accelerated Depreciation in the United States 1954-60. By NORMAN B. TURE. New York: National Bureau of Economic Research, Fiscal Studies 9, 1967. Distributed by Columbia University Press, New York and London. Pp. xix + 238 (text 101; appendices and index 137). $7.50.

Those who would know or have some feeling for the basic quantitative contours of our economic and financial structure need to have a working knowledge of the anatomy of our tax depreciation system.

This excellent study by Ture, which helps fulfill this need, is one of a series sponsored by the National Bureau of Economic Research. The particular set of studies of which this volume is a part is concerned with the

effect of the corporation income tax on business decisions affecting the growth of enterprise.

The study is characterized as the first comprehensive investigation of taxpayer response to the liberalized depreciation methods (double-declining balance, sum-of-the-years digits, and equivalent formulas) authorized by the Internal Revenue Code of 1954. One of the three major revisions of the tax rules governing depreciable assets in the post-war period—the other two being the shortening of depreciation guideline lives and related changes provided by Revenue Procedure 62-21, issued in July 1962, and the investment tax credit introduced by the Revenue Act of 1962—the 1954 provision for liberalized methods is considered by the author to be the most significant for several reasons: it was the first major generally-applicable liberalization since the restrictive changes of 1934, it increased the range of acceptable depreciation-apportionment formulas, and its revenue impact was potentially both relatively and absolutely greater.

The Ture study has two stated basic purposes:

(1) to determine the extent of use of the new provisions by taxpayers in the 1954-1960 period; and

(2) to estimate the effect of the use of the new methods on the amount of corporate depreciation deductions, income tax liabilities, and capital outlays.

The study begins with an introductory chapter which, among other things: (1) reviews briefly alternative approaches to depreciation liberalization; (2) describes the sources of data for the study; (3) presents mathematical formulations of the double-declining balance and sum-of-the-years digits methods, with computations of the present discounted value of depreciation allowances under the various depreciation methods for different service lives, and assesses the impact of accelerated depreciation formulas on the present discounted value of the future stream of tax deductions, the profitability of investment, and the effective tax rates applicable to investment in depreciable property; (4) examines the problems involved in evaluating the effect of depreciation liberalization on the investment decisions of the individual firm, and in measuring its impact on aggregate investment in depreciable facilities; and (5) lists some of the possible constraints which militated against universal adoption of the accelerated tax depreciation methods.

There follows a detailed recital-digest of the statistical findings, supported by Appendices A-D, on the extent of use of the accelerated depreciation methods, measured by dollar amounts of property, amount of depreciation deductions generated and their excess over straight-line depreciation, and the number of business taxpayers electing to use each method. The statistical analysis includes breakdowns of the data on depreciation deductions and methods, by size of business receipts or total assets of the firm and by industrial division. The statistical presentations include valuable data on depreciable lives of assets in accelerated method accounts, by total asset size of the corporation, and by industry division.

The discussion includes interesting analyses (Tables 34-35, pp. 80-81) showing the percent of cost of depreciable assets acquired after 1953 in accelerated-method accounts, by service life used for tax purposes cross-classified, respectively, by industry division and by major asset types. Appendix C, pp. 179-186, furnishes some useful highlights on service lives of different kinds of assets used by corporations for tax purposes prior to the 1962 guideline life revision.

The study estimates that companies using the accelerated methods claimed about $2.4 billion additional depreciation in 1959 over what they would have received under the straight-line method, reducing their income tax liabilities in that year by about $1.265 billion, or 5.6 percent of the total corporate tax liability of $22.525 billion reported for 1959 (equivalent to a 5.3 percent reduction in tax liabilities for corporations as a whole).

An unobtrusive two-page analysis, supported by Appendix E, is devoted to the effect of acceleration on the volume of investment in depreciable assets. Based on unpublished interview studies by Professors Hall and Stanback which suggest substantial positive business response to tax depreciation changes, and a schematic analysis of the effect of acceleration treated as a factor influencing corporate capital supply and demand functions, the study suggests that the $1.265 billion estimated corporate tax sav-

ings from acceleration in 1959 may have increased annual investment by amounts ranging from $1.3 billion (roughly equal to the tax savings) to $5.7 billion (about 4½ times the tax savings).

A short summary and conclusion section presents 14 basic findings:

1. some 45 percent of post-1953 depreciable assets were in accelerated method accounts by 1959;

2. more extensive adoption of accelerated methods by larger than by smaller corporations;

3. wider use of accelerated methods in manufacturing than in other fields;

4. closer association of use of accelerated methods with company size than with other characteristics (industrial division, type of asset, or service life);

5. pronounced increase in the proportion of total corporate depreciable allowances under accelerated methods between 1954 and 1960;

6. accelerated depreciation allowances amounting to 52 percent of post-1953 facility acquisition (almost two-thirds in the case of corporations with total assets of $25 million or more);

7. less extensive use of accelerated methods by unincorporated businesses than by corporations (one wonders whether this reflects essentiallly a characteristic of small business rather than of the form of legal organization *per se*);

8. two-thirds of the $2.4 billion additional allowances attributable to accelerated methods in 1959 generated by the double-declining-balance method and one-third by the SYD method;

9. wide variation from industry to industry in the proportion of total allowances representing an increase due to acceleration;

10. wide variations by industry and size of business in the proportionate distribution of the estimated $1.265 billion tax savings from acceleration;

11. substantial impact (between $1.3 and $5.7 billion or a multiple of between 1 and about 4.5 of the tax benefits involved) of accelerated depreciation in raising corporate outlays for depreciable facilities;

12. sharp increase between 1954 and 1960 in the number and proportion of corporations reporting use of the declining-balance depreciation method, as against very little increase in the proportion using the SYD method (one wonders how this result is affected by the apparent inclusion of data for the 150 percent declining-balance method, available to taxpayers prior to 1954, along with figures for the statutory 200 percent declining-balance method);

13. small proportions of unincorporated businesses using accelerated methods in 1959 (among sole proprietorships, 5.5 percent DB and less than 1 percent SYD; among partnerships, 10.7 percent DB and 2 percent SYD); and

14. inverse relationship between size of firm and exclusive use of the straight-line method.

An expositional slip in the summary section dealing with the relative magnitude of the additional depreciation benefit due to the accelerated methods may confuse the unwary reader. Point 8 on page 99 contains the statement that "The $2.4 billion of the additional allowances is almost 50 percent more than the allowances that would have been available under straight-line in accelerated method accounts." As the earlier presentation on page 88 and the basic data in Table D-9, p. 224, indicate, the estimated straight-line depreciation on assets in accelerated-method accounts would have been over $4.9 billion in 1959; the accelerated depreciation was a little less than $7.4 billion; so the excess of $2.4 billion was slightly less than half the straight-line, *not* 50 percent more than the straight-line as indicated in the quotation. A similar slip is apparently repeated in the summary of the findings on large manufacturing and utility corporations, also on page 99.

The study provides a well-organized and interpretive statistical compendium on the experience in the first 6 or 7 years following the introduction of the accelerated methods in 1954. Some of its data and findings, for example, on the extent and patterns of use of the accelerated methods, have been available and known to students of the subject for several years, particularly since the Internal Revenue Service release of *Statistics of Income, 1959, Supplementary Depreciation Data From Corporation Income Tax Returns*, published in June 1965. However, the intensive reworking and analysis of these data by the Ture study make a substantial net contribution.

The study makes little attempt to explore possible causes of the patterns of development it uncovers, for example, the interplay of open-end accounting techniques and depreciation method. Nor does it generally suggest related implications for public policy. With respect to the relationship between liberalized depreciation and business capital formation, however—the most important single policy question in the area of its investigation—the study reaches the more than tentative conclusion, that liberalized depreciation has been a positive and substantial factor in raising business plant and equipment expenditures. This is an important conclusion and I believe a correct one, but its persuasiveness is, I feel, unfortunately dimmed by the somewhat perfunctory character of the quantitative estimates of the impact on investment, the absence of in-depth discussion of the investment function problem which confronts any econometric measure of the impact of tax stimuli to business capital formation, the relatively wide range of the estimates themselves, and the limited descriptive background on the Hall and Stanback interview studies cited as revealing substantial business response to tax depreciation revisions.

RICHARD E. SLITOR

U.S. Treasury Department

Household Capital Formation and Financing 1897-1962. By F. THOMAS JUSTER. New York: National Bureau of Economic Research, 1966. Pp. xii + 146. $6.00.

Economics traditionally considers capital as a factor input used in the production of goods and services for resale. Goods fulfilling the requirements of this definition yield a stream of productive services to the owner when used in combination with other factors of production. So arranged, the capital yields a valuable flow of goods and services to the entrepreneur—valuable to the extent that he can sell the result in the market. Thus, capital is considered the domain of the business sector and to a lesser extent the government sector of the economy. The principal exception to this tradition has been the treatment of owner-occupied residential housing as capital in the National Income accounts.

In the present book, the author extends the concept of capital to many other goods used in the household. Automobiles, furniture, washing machines, television, hi-fi, radios and other major durables as well as home furnishings (china, silverware), books, passenger car accessories, medical appliances, and other miscellaneous durables are examples of household capital. Goods to be counted as capital must yield a stream of services over a period of time. In the case of this study, they must do so for a period of a year or more. Obviously, it is easy to go through the list and quarrel with particular choices or exclusions. For example, certain soft goods such as clothing are not counted, although they may fit the definition.

Clearly, this is a broad definition of capital. Since households both consume and produce goods and services, some distinction between production and consumption in the use of goods should be made. For example, the housewife sewing with her sewing machine is both producing and consuming satisfactions she gains from the activity. To take another example, cleaning the house with a vacuum cleaner provides consumer satisfaction to the housewife through the return to her pride in her reputation as a neat housekeeper. On the other hand, stoves, refrigerators, and washers yield productive services since their services directly provide for the maintenance of the family. Household capital as defined by Juster blurs these distinctions.

The author distinguishes three groups of household assets: major durables, minor durables, and nonfarm owner-occupied construction. The distinction between major and minor durables has been made in terms of several analytical objectives. One goal was to compare trends in household assets that are close substitutes for enterprise assets; a second was an analysis of the role of consumer credit in household capital formation; a third was the construction of estimates of imputed income and flow of consumer services from householder equity in tangible assets.

Ability to substitute consumer-owned tangible assets for enterprise assets occurs wherever the consumer has the choice of rental

or of owning the asset. Rental-housing is the time-honored example and, of course, rents on comparable units have been used to estimate the value of the flow of services from owner-occupied dwellings. Juster argues that to a large extent such substitutability extends to a wide range of assets held by consumers. Self-service laundromats substitute for washers and dryers in the home, and, hence, the use value of washers and dryers can be derived from the value of laundry and laundromat services. He further argues that "laundromat services are probably as good a proxy for the services of owned laundry equipment as would be true for rental vs. owned housing." (p. 16) Similarly, there are rental markets for automobiles, radios, television sets, musical instruments, and so on. When one eats out, he rents the services of china and cooking utensils. Although granting that relevant data is often hard to obtain, it is argued that as long as "markets exist in which the assets themselves can be rented on terms comparable to those involved in purchase, e.g. for a time span equal in length to the holding period typical for purchasers, or in which a reasonable approximation to the services can be purchased directly," (p. 17) it is conceptually possible to achieve estimates of the value of the flow of consumer services from the capital stock held by households.

After a brief digression on the nature of goods commonly rented by households, the author defines major and minor durables. The important distinctions are high initial unit costs, the existence of direct rental markets, a high proportion of credit purchases, and relatively long service life. Goods having these characteristics are major durables. Minor durables—tableware, glassware, books, toys, sporting equipment, automobile accessories, and so forth lack some of these characteristics, and they are in many cases in competition with enterprise-produced services or with potential enterprises that would provide services if it had not always been uneconomic to do so.

Data to measure capital formation in households are derived from Goldsmith's *Study of Saving and National Wealth*, and Goldsmith, Lipsey and Mendelson, *Studies in the National Balance Sheet of the United States*. Where necessary, Juster has revised data to conform with his definition of consumer capital and updated the material to 1962.

It should be noted that on the difficult issue of using gross or net capital formation, the author has chosen the former on the ground that reliable data on either service life or the pattern of decline in economic value of these assets do not exist. In the author's words, he had to choose between "using either [a] conceptually inappropriate series that can be easily and reliably estimated or conceptually appropriate ones whose empirical foundations are questionable." (p. 22) If, as seems likely, there are significant systematic changes in the service and/or economic life of tangible assets owned by households, no conclusions can be reached concerning the value of consumption services.

Turning to Juster's conclusions, he notes that if, following Kuznets, we define capital to include only productive tangible assets held by the business sector, total savings have been declining as a fraction of total output. If, however, appropriate account is taken of household capital information, the fraction of output going to tangible (gross) assets has been either steady or increasing; on a net basis it probably declined. The author finds support for his findings in studies reporting a systematic upward bias in capital-goods price indexes (including consumer durables) relative to price statistics for other goods. Further, if investment in intangible assets (education, health, and research and development) are considered, then the ratio of investment to GNP has shown a steady increase since the turn of the century.

The study includes, in addition, an analysis of the development of consumer capital markets in which his most interesting notion relates to the appropriate measure of cost of borrowing to the consumer. Borrowing costs to the consumer are not the market rate of interest, but may be either the marginal rate of time preference involved in reducing consumption to meet repayments schedules or the marginal rate of return on liquid assets.

These conclusions follow from his analysis of household behavior in the consumer credit market. His analysis of cyclical movements

in household capital formation and consumer credit leads him to the observation that movements in the household sector contribute to cyclical disturbances, and most of the cyclical behavior can be attributed to the fact that outlays for tangible assets by households are related more to credit availability rather than income. In Appendix B, the author provides what he calls "crude" estimates of imputed income based upon his estimates of capital stocks held by consumers.

Extension of the concept of capital to the household leads to a displacement in time of reported consumption, and hence may add to the accuracy of measurement of GNP. Yet, if we contemplate the as yet unsolved problems of depreciation and inventory accumulation in the household as well as the price index problems so ably described by Juster, there can only be the barest of hints concerning the impact on National Income accounting resulting from this far-reaching change in concepts. Moreover, one also must ask whether the change yields new understanding of economics that we did not have before. Certainly, for some purposes, there is a gain in knowing the extent and degree to which production techniques have changed in the home, but the change may have been of a different order than that implied by the data.

Although automatic washers and dryers have replaced the washboard and tub, packaged soap has replaced the homemade variety. Refrigerators have replaced ice houses and cellars, but refrigeration has been used as the basis for the preparation of food outside the home. In addition, radio, television, and hi-fi have provided home entertainment, replacing stereopticans and the family organ or piano for home entertainment. (Home movies and slides and musical instruments may be making a comeback.) The spinning wheel, the loom, and quilt making have been replaced by ready-made soft goods. In sum, the nature of household capital changed in the early decades of the 20th century and so did the quality of life. The valuation of nonmarket household production at the turn of the century is a difficult task, and the kinds of capital inputs have changed since 1900 both in kind and in the services afforded the consumer. Household capital may be such a slippery concept that its measurement introduces more questions than answers. Given the technological changes of the last 60 years, the enumeration of "household capital," that is, consumer durables, leads to the conclusion that the rate of capital formation has been maintained. The unanswered question is: Of what analytical importance is the change?

An answer to this question might be that estimates of capital formation in the household can lead to more accurate measurement of consumption. It is here that the most serious reservations about the value of the study rest. Close substitutability between rental-housing and owner-occupied housing has made possible estimates of the consumption value of the latter type of housing. Rental markets for other types of consumer durables are not widely developed. Moreover, where there are rental markets, they often serve some short-term need such as the unavailability of rentals on terms permitting the household to compare the relative costs of rental and ownership. The long-term lease market for cars comes closest to the ideal, yet it appears to serve special needs in the urban market rather than the more general automobile needs of the suburban household.

When one turns to enterprise-supplied services as a close substitute for the services of household capital, we need some notion of the cross elasticity of demand between the two forms of service. To say that laundromat service or laundry service is a close substitute for washers and dryers implies some idea about the cross elasticities of demand between the cleaning services. Similarly, to say that restaurant services are close enough substitutes to estimate the value of consumption services derived from cooking and eating utensils depends upon what we know about the degree of substitutability of the one for the other. Moreover, the wide variety of enterprise-supplied eating services —ranging from take-out or premises-consumption at drive-in or restaurant services —complicates the analysis. We note that a given family rarely both rents and owns living quarters at the same time, but can and does own and use cooking and eating equipment and uses restaurant services frequently. It is obvious, I think, that the valuation of the flow of capital services to the household is an exceedingly difficult problem.

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Selected Papers, 1945-1953. By CLARK WARBURTON. The Johns Hopkins Press, 1966. Pp. xv + 425. $10.00.

This volume consists of 19 articles and papers, a number of them originally printed in leading journals, and an introduction that conveniently states the controversial issues during the period encompassed by the book.

The papers are divided into five parts. Part I deals with the role of money in business fluctuations, and Part II with the relation of the quantity and velocity of money to effective demand and the price level. Part III covers the relation of savings, debt, and liquidity preference to monetary policy and business instability, and Parts IV and V discuss central banking and monetary policy and the question of improvement of monetary policy.

These essays constitute a personal record of Warburton's views as they developed in the light of his statistical work over the years, work that was performed in an effort to convince doubters of the paramount importance of the quantity of money in the achievement of economic stability. Warburton came early to the conclusion that changes in the money supply play a causal role in the business cycle, and that such changes have historically often been erratic. Instability is thus attributed to the banking system, with the Federal Reserve System chiefly responsible. In Warburton's view, it is not debt repayment by the business man that is the initiating force. The source of instability is changes in the volume of money, rather than a disequilibrium between intended investment and intended saving, or a change in liquidity preference.

The author finds that changes in the stock of money typically have preceded those in effective demand. The problem with which he, along with other exponents of the importance of the quantity of money, confronts the Keynesians is how to explain the disposition made of the new money that is created in response to an increase in bank reserves. No psychological function is advanced by the "quantity men." The opposition is simply saddled with the task of denying effectively that the newly-created money is somehow spent. Incidentally, Warburton makes it clear that his work involves the study of the theory of monetary disequilibrium, not the theory of growth.

The reader is likely to find himself at a loss to reconcile Warburton's findings with those of later statistical investigators. He takes the National Bureau of Economic Research to task, for example, for a failure to utilize measures of the quantity of money in its manifold series relating to business fluctuations. Warburton apparently first called attention to this alleged deficiency in an article published in 1946. In *Business Cycle Indicators,* published by the Department of Commerce, the money supply is in fact unclassified. Therefore, it does not appear in the lead indicators, as it should if National Bureau investigators found themselves able to agree with Warburton that the prospective yield on new capital lags (at least slightly) behind the monetary contractions of the period covered by the author's data (p. 81). It is of interest to note that *Business Cycle Indicators* (for example, September 1966, p. 1) states that "Some of these series such as change in money supply, merchandise trade balance, and cash surplus or deficit, represent important factors in the economy, but they have not qualified as indicators for various reasons, such as irregularity in timing." Warburton, writing a number of years ago, believed he found some regularity, but the author is disposed to accept the views of specialists in the area writing at the present time.

Those who are convinced that changes in aggregate spending are best explained by psychological functions, such as the inducement to invest, will never be satisfied with what is akin to an asset-choice explanation of spending. Asset choice is the beginning of the explanation, not the end. A largely mechanical relationship seems to be involved in any purely monetary explanation of the performance of the economy. Individuals find themselves in possession of more money. They are forced to dispose of it in some way. What is not held idle, impinges on the supply of goods and services, so that at high levels of employment the price level is advanced. Rising prices lead to "windfall" profits, and then to a more rapid use of money by firms. This is a very different explanation of the boom from that based on the instability of the investment function. Warburton, while agreeing that "empirical

data do not provide direct measurement of Keynes' psychological factors," nevertheless believes that data can be selected that do relate to them (p. 75).

In line with his views on the source of economic instability, Warburton makes a number of policy recommendations. He believes that Federal Reserve policy has improved in recent years, but apparently supports the view that the Federal Reserve System be placed under a new executive department, separate from the Treasury (p. 13). He does not have much confidence in the quantitative impact of interest-rate changes on aggregate demand. On the international side, he does not find the dilemma between internal and external stability to be as acute as many economists believe. He favors more flexible exchange rates, at least to the extent of granting the International Monetary Fund the power to widen the gold points. If the United States government were to guarantee foreign holders of dollars against loss due to international depreciation of the dollar, this would, Warburton believes, encourage them to continue to hold dollars despite fluctuating dollar exchange rates. It may be noted that, in the event of a persistent decline in the international value of the dollar, foreign holders would thus acquire increasing amounts of dollars. If and when some of these dollars were used to buy American goods, the international depreciation of the dollar would be converted to a greater or less extent into an internal depreciation of the dollar, that is, inflation. Alternatively, holders of dollars might, in time, insist on conversion into their own currencies. At the least, we would be more vulnerable to official policy with respect to foreign dollar holdings.

Warburton's view that the 1964 tax cuts were not the cause of the long upswing which followed—that the substantial rise in the money supply was the cause (p. 18)—is difficult to accept. Both factors undoubtedly contributed. It is perhaps unfortunate that advocates of the importance of the money supply often lead themselves into a position of denying other functional relationships that clearly exist, whatever their quantitative effect may be.

Warburton advances the interesting view that the money supply need not grow at the same secular rate as physical output in order to sustain a high rate of economic growth. Growth can occur, he asserts, even if prices are falling. He does say, however, that a steady-growth monetary policy is needed if growth is to be maintained with price-level stability.

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Indicators of Business Expansions and Contractions. By GEOFFREY H. MOORE AND JULIUS SHISKIN. New York: National Bureau of Economic Research, 1967. Pp. xiii + 127.

W. C. Mitchell's objective in the study of business cycles was to rescue it from an embarrassingly large array of seemingly plausible hypotheses which could remain acceptable only because of inadequate statistical referents. At the National Bureau of Economic Research and elsewhere, an important statistical advance along these lines was made by the development and processing of thousands of time series and classifying them by their timing response to peaks and troughs of the business cycle. A second phase of investigation, that of theorizing, was left by Mitchell to the future. Still, its place on his research schedule was assured. Indeed, that was destined, I believe, to be the centerpiece of his research table.

Considering the immense talents and demonstrated scholarship of the authors, it was to be expected that their efforts in this book would again result in further advantageous refinement in the processing and classification of the business indicators. It contains the latest of five efforts since 1938 to update and reclassify the leaders, coinciders, and laggers of business cycle turning points. More than half the book contains tables and charts which make it a mine of information concerning the performance of 20 major economic time series during the postwar period. However, Mitchell surely knew that the work of classifying statistical series in business cycles could enter the phase of diminishing returns, and that models of economic relationships, however tentative, should begin to be constructed.

Although the point of negative returns may not yet have been reached in reclassifying the indicators, the risks are greatly increased with the publication of this book. Acceptable business cycle theory is now generally free from the impressionistic influences decried by Mitchell; for the future, a step beyond the confines of statistical reclassifications of the indicators appears in order.

Apparently concerned with this problem of imminent redundancy of effort, the authors themselves raise the question regarding what "improvements take place when a revised list of National Bureau indicators is released." Their conclusion is that the indexes of change in the postwar period "based upon the 1966 list are virtually the same as the corresponding indexes based upon the 1960 list. This reflects the fact that on an overall basis the new and old lists have many common elements" (p. 83). Accordingly, the advantages of the new list and the achievements of the book lie outside the performance of the indicators in the postwar period. They consist of (1) a scoring system for evaluation of individual series as indicators, and (2) a cross-classification by "economic process."

How does this book help analysts of the business cycle? Whatever the virtues of the indicators approach to business cycle analysis, the classification of economic series in relation to peaks and troughs continues to be useful—at the least, for its property as a convenient and well-organized checklist of the performance of well-known and relevant statistical series. Together with the monthly *Business Cycle Developments,* the postwar record of the new classifications will provide for analysts of the business cycle nearly painless access to verification of impressionistic assertions. Back-of-the-envelope business forecasters can hardly do without *BCD.*[1]

This checklist characteristic of the indicators is analytically a more useful and trustworthy quality than is its worth as a tool in predicting business-cycle change. The book presents an ingeniously derived composite index of the leading indicators which, in its "amplitude-adjusted" form, is constructed by standardizing the month-to-month percent changes of the leaders in order to provide a single forecasting measure of business cycle change. The authors do not evaluate the performance of this index as a forecaster, indicating that the controversy on the indicators approach already has been well-published. No defense is here presented to explain the variability ranging from six to 22 months in the period of decline of this index prior to the four postwar expansion peaks. Actually, an effort to overcome the defects of this measure on this account was recently developed by Shiskin, but, apparently, too late to include in this book.[2] In its newer "reverse trend adjusted" form, which makes allowances for the upward secular trends in the economy, the index has eliminated much of the aforementioned variability, but not some other major limitations. In the latest version, for example, the index of the leaders flagged or faltered prior to continued expansion in 1951-1952, 1956-1957, 1962, and 1966. These are especially disturbing results in view of the intent of the indicators system to forecast the direction of change in business, rather than to serve as a quantitative measure of the change.

A shift toward theorizing would have helped eliminate certain oddities in the authors' classification of "leaders" and "laggers." For example, classifying change in business inventories as a "leader" may be faulted because stocks may respond quickly to miscalculations in the balance of production and sales; a rise (or fall) could well evidence coming contraction (or expansion) in business activity. The sharp late-1966 rise in inventories presaged slowup, not expansion, in economic activity in early 1967. Indeed, the inventory-sales ratio may have helped to predict this slowup, but this is not offered as one of the "advance" indicators. Again, classifying change in manufacturers' unfilled orders for durable goods as a "leader" in an economy close to capacity

[1] *Business Cycle Developments,* Bureau of the Census, U.S. Department of Commerce, Washington, D.C.: U.S. Government Printing Office.

[2] Julius Shiskin, "Reverse Trend Adjustment of Leading Indicators," *Review of Economics and Statistics,* February 1967, pp. 45-49.

operations may not be as significant as is its level in forecasting economic activity. (The unfilled orders-shipments ratio would be a better selection. The book, however, shies away from using ratios or relationships; only one of 36 leading indicators is a ratio.) [3] Business expenditures on plant and equipment is classified as a "lagger" even though initial declines in outlays coincide with the start of three of the four postwar recessions. Change in mortgage debt, except for the current expansion, appears to have moved counter-cyclically, rather than as a "leader."

Much of the book is concerned with a scoring system in which 88 time series were rated with respect to (1) economic significance in relation to business cycles, (2) statistical adequacy, (3) historical conformity to business cycles, (4) cyclical timing record, (5) smoothness, and (6) promptness of publication. If its intent is to draw attention to the necessity for viewing statistics with caution, the layman is well warned. The rest of us, however, may continue to peruse carefully such significant but low-scoring series as capital appropriations in manufacturing, the volume of this backlog, exports, the entire array of defense activities including obligations, awards, spending (which from mid-1965 forward played a major role in this accelerated expansion of 1965-1966), total Federal cash payments to the public, and the like. All of these score high or very high on the basis of economic significance—inevitably so because the series have been selected on this basis—but the other criteria, just noted, lower the total score. They represent a statistical trap. (Indeed, Shiskin elsewhere has demonstrated how much imaginative work can be done to render statistics more reliable, as in his "reverse trend adjusted" index noted above.) To their credit, the authors acknowledge that "arbitrary element" and "judgment" have entered into the scoring. My judgment would have given the economic-significance weight much more than one-fifth of the total, at the expense of some other merely statistical characteristic for which allowances frequently can be made. Notwithstanding their low score under this system, I am happy that A. G. Hart, Shirley Almon, and others were not dissuaded from making studies of the capital appropriations process on the basis of the existing series. Finally, the scoring system yields little to the researcher that would not be better gained by calculating standard errors of estimate—a calculation which would be specific for the particular problem at hand, as well as operationally useful. I would agree with the authors that "The results [of the scoring system] depend to a degree upon the questions asked, the points assigned to each, and the judgment of the examiner . . ." (p. 28).

The book poses a problem of importance—the pattern of change in economic processes during business cycles—but our high expectations of getting the views of these veteran researchers are dashed. The subclassification of the leaders, coinciders, and laggers by such "economic processes" as *investment, employment, money and credit, prices, costs, and profits,* raises unfounded hopes that relationships will be disclosed. For example, recognizing that capital appropriations (a "leader") bears some relation to later capital expenditures (a "lagger") in the *investment* "process," it would have been informative to learn the factors bearing on this relationship. In the *prices, costs, and profits* "process," industrial materials prices, stock prices, and corporate profits are "leaders," the more general wholesale price indexes are "coinciders," while labor costs per unit is a "lagger," but the mechanism of the process itself is unexplored.

In spite of their vast knowledge in this field, Moore and Shiskin, at least in print, appear averse to making even tentative generalizations on cause and effect or functional relationships of the significant variables in business-cycle analysis. Perhaps this explains a remarkable if minor feature of this book. Though thousands of economic variables that affect economic activity and

[3] Beginning with the July 1967 issue, *Business Cycle Developments* has introduced eight such ratios under the heading "unclassified indicators." Perhaps the next book by these authors will break new ground. The word "ratio" is here intended to designate a relationship rather than a rate such as profits per unit of sales.

business cycles are examined, and over a hundred appear in chart or table form in this book, the time series on disposable personal income is omitted. Fiscal theorists, "fine tuners," and others will be troubled.

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Errata

These are corrected versions of Table 1 and Table 16b which appeared in Ira O. Scott, Jr., "European Capital Markets," *The National Banking Review*, 4, December 1966, pp. 138, 143.

TABLE 1

Ratio of Stock Exchange Volume to GNP

	Percent	
	1963	1964
1. Switzerland	47.43	45.11
2. United Kingdom	n.a.	34.15
3. United States	11.06	11.79
4. Netherlands	3.54	3.13
5. France	3.3	2.6
6. Italy	3.29	2.58
7. Belgium	3.09	2.92
8. West Germany	n.a.	n.a.

TABLE 16b

Estimated Annual Cost, other than Interest, Incurred in the Flotation of a 15-Year, Domestic Industrial Bond, during the First Quarter of 1965 (Percent)

	Initial underwriting cost other than discounts from par, on an annual basis	Annual costs associated with the outstanding debt	Total annual cost
1. United Kingdom	0.82	0.03	0.112
2. United States	0.76	0.10	0.176
3. Netherlands	0.26	—	0.26
4. Switzerland	0.22	0.05	0.27
5. Belgium	0.23	0.10	0.33
6. West Germany	0.27	0.24	0.51
7. France	0.39	1.08	1.47
8. Italy	0.30	2.48	2.78

The correction in Table 16b affects the shifts that occur in the ordinal list when non-interest, flotation costs are used, in place of total flotation costs or effective interest rate, as the basis for comparison.

The author also failed to acknowledge his indebtedness to Catherine K. Berrett for collecting the mass of data upon which the tables in this article were based.